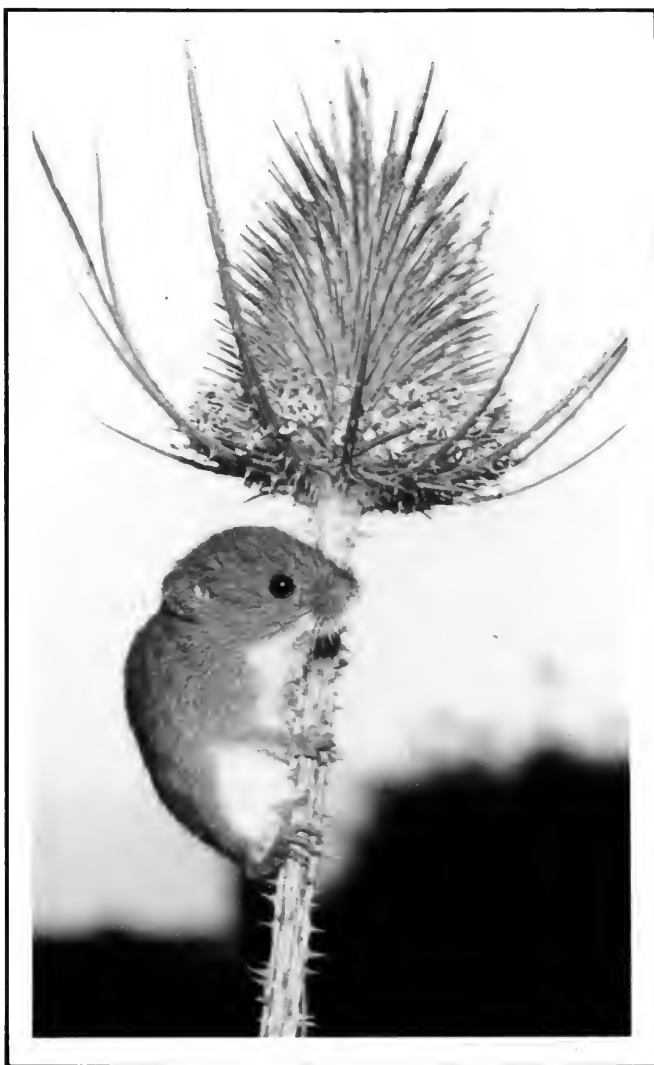


ATLAS OF THE MAMMALS, REPTILES AND AMPHIBIANS OF LINCOLNSHIRE AND SOUTH HUMBERSIDE



by
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President Lincolnshire Naturalists' Union 1982

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INTRODUCTION

Compared with the birds, the number of species of wild mammals reptiles and amphibians found in Lincolnshire and South Humberside is small. Most of these are common or even abundant and only a few are local or rare. Despite this, little work has been carried out on this group in the past; the last account of the mammals of Lincolnshire appeared in the Lincolnshire Naturalists' Union Transactions of 1912 as "A Preliminary List of the Lincolnshire Mammals" compiled by the Rev. F.L. Blaythwayt, MA, MBOU. A full list of the county's reptiles and amphibians was last prepared by R. Wood Powell, LDS, for his Presidential Address, delivered to the Union in Lincoln on November 15th 1941.

For this reason the Lincolnshire Naturalists Union held an animal survey between 1975 and 1978, designed to bring up to date our knowledge of the non-avian vertebrate fauna of the area; the results are presented in this atlas.

The boundaries of the survey were those of the old county of Lincolnshire (pre-1974) and the mapping unit was the 'tetrad' or 2x2 km square. Unless otherwise stated the maps show records acquired during the survey years. All the commoner mammal species were found in every tetrad searched during the survey, including the towns, and many of them were found to be numerous in all suitable areas throughout the county. They have therefore not been mapped, since gaps would be misleading, denoting only lack of observer cover.

Over the county coverage was good. Every 10 km square was surveyed, and in more than two-thirds of them, every tetrad was visited. Besides members, observers were recruited via press articles, local radio broadcasts and appeals to schools. Additional information came from the files of the Forestry Commission, Lincolnshire and South Humberside Trust for Nature Conservation, Ministry of Agriculture, Fisheries and Food, Scunthorpe Museum, and the Grimsby Docks Board, whose help we gratefully acknowledge. Where gaps exist, mainly in the fenland areas and parts of South Humberside, I hope the publication of this atlas will act as a spur to those interested to fill them in! A great deal remains to be done, particularly in working out the distribution of the bats, especially the rarer species such as Natterer's and the barbastelle bat, and also the dormouse, yellow-necked mouse, otter and several of the introduced species of deer.

M. Johnson,
City and County Museum, Lincoln.
November 1980.



Harvest mouse in Phragmites reedbed

Physical and habitat features affecting the mammals, amphibians and reptiles of Lincolnshire.

Although the relief of Lincolnshire is not as flat and monotonous as is commonly believed, the survey showed that of itself it doesn't affect the distribution of animals. Thus the scarp slopes of the two "upland" areas - the limestone ridge and the chalk wolds - rise quite steeply from alluvial plains, but attain only maximum heights of just under and just over 500' respectively. Where rock outcrops occur they are limited in extent, and over the vast majority of the county there is sufficient depth of soil for all the burrowing animals, or to support vegetation, including trees, giving cover to those living above ground.

One physical feature which does affect a number of species is the presence of suitable water, either flowing as a river or stream, or still as lakes, ponds and drainage ditches. All the amphibians need fresh water in which to spawn and among mammals the otter, water vole and water shrew are tied to water courses. Fortunately there are very few tetrads in the county without standing or flowing water; besides the natural streams, all the lowlands are provided with a network of ditches and dykes for drainage. The last few years have also seen a large increase in the construction of farm reservoirs, providing water for irrigation and to some extent balancing the loss of farm ponds.

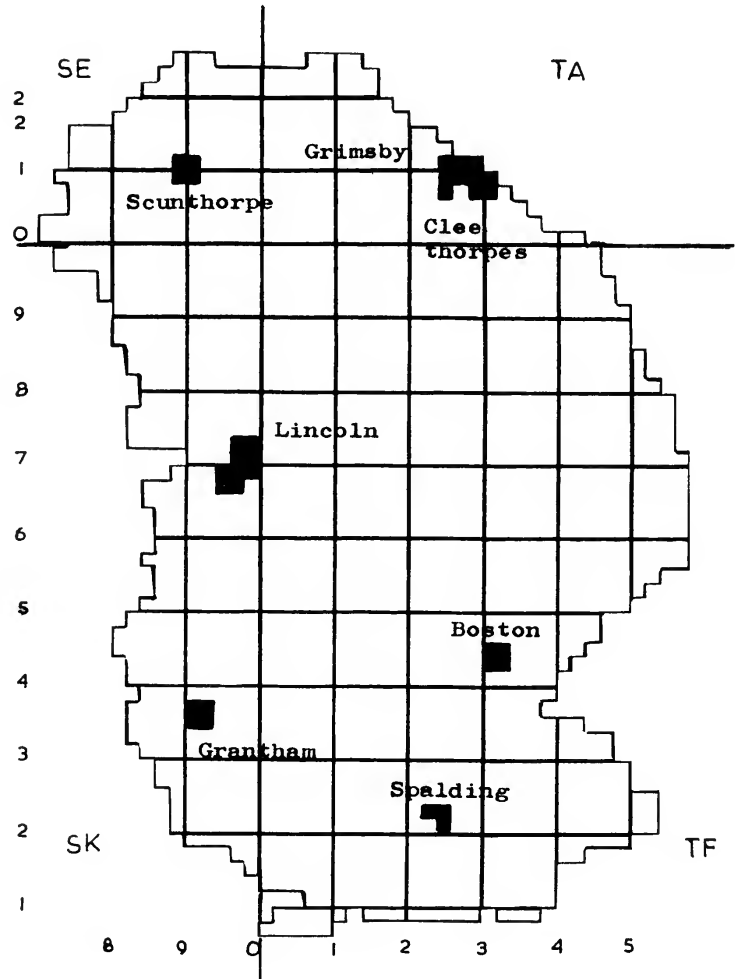
Apart from water the two most important specialised habitats for vertebrates in the county are probably heath and woodland. There are no extensive areas of the former left, but remnants can be seen on the cover sands piled against the western faces of the wolds and limestone cliff (the old warren sites), in the Woodhall area and around Sleaford. Some of these sites are protected as nature reserves or golf courses. The coastal dune system also provides some of the same conditions, which are particularly important to the snakes and lizards.

Despite extensive planting by the forestry commission (much of it unfortunately on the old heathland areas) the county as a whole does not have a lot of woodland. The northern half, including South Humberside, is better off in this respect, with private woodlands around Scunthorpe and Brocklesby, the commission's Willingham and Laughton Forests and a scatter of woods around Gainsborough (the old Thonock Chase) and Louth.

The centre of the county has good woodlands west and south-west of Lincoln, and also Bardney Forest; many of these are primary woodlands and of great interest for other natural orders as well as vertebrates. In the south the fenlands have little but shelter belts and small coverts, but the south-west has

the Bourne Forest, private woods at Grimsthorpe, and the woods on the Leicestershire border.

All of these woods are important as reservoir areas to most of the small mammals and some larger ones, including the badger. They also hold increasing numbers of deer, and possibly such animals as the pine marten. The northern woods particularly may also be the last refuge of our remaining red squirrels.



Map of the county showing 10 km squares and tetrads
(Crown Copyright Reserved)

The Tetrad Maps

Lincolnshire and South Humberside cover parts of the four 100 km National Grid squares identified by the letters SE, SK, TA and TF. Each of these can be further divided into a hundred 10 x 10 km squares, and these can be divided again. The map (fig 1.) shows the county divided into the "tetrads" each 2 x 2 km, used as the unit for the survey. The coast line, inland borders and principal towns are also shown.

For clarity, the species maps which follow show only the 10 km square boundaries.



The hedgehog is a very common mammal that can be found in any part of the county in spite of the fact that hundreds are killed every year on our roads. Hedgehogs are found in every tetrad searched for them, and their distribution is therefore not mapped.

The hedgehog hunts mainly by night but like other nocturnal animals it does not always wait until darkness before emerging from its daytime hiding place to seek food. When nights are short in May, June and July it probably finds difficulty in obtaining sufficient food during the hours of darkness and at this time of year it is often possible to count up to a dozen hedgehogs along a hundred yards of hedgeside all out hunting an hour or more before sunset.

Most people think of the hedgehog as a comparatively slow animal but it can move quickly enough on occasion. It can also climb better than would be expected and the animal photographed was found walking along the wall top in daylight. It probably sustains a few falls but when a rolled-up hedgehog hits the ground its spines usually take most of the shock and the animal is not hurt unless the drop is a high one.

Survey results were mainly obtained from sight records and deaths on the roads.

References

Book: The Hedgehog, by Maurice Burton
Others: Hedgehogs, Forestry Commission booklet.

Shrews

Common Shrew Sorex araneus L.

Pygmy Shrew S. minutus L.

Water Shrew Neomys fodiens

There are three different kinds of shrew found commonly in Britain; the Common Shrew, Pygmy Shrew and Water Shrew. Shrews are small mouse-like mammals which can easily be mistaken for mice until they are examined in the hand. In spite of their appearance however they belong to the Insectivora and are closely related to the hedgehog and the mole. They feed mainly on insects and worms, but they will also eat the carcasses of other animals, including members of their own kind.

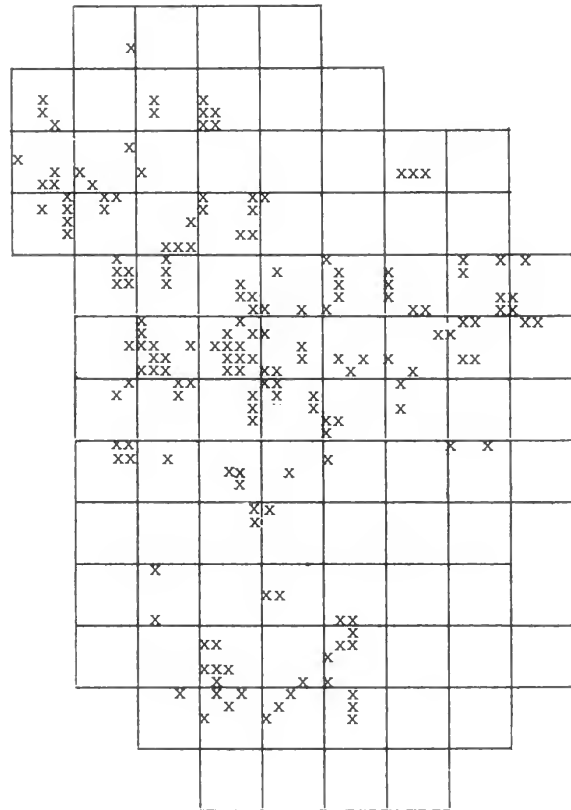
Shrews are not easy to observe because they live in tunnels just below the surface of the ground or in run-ways under leaf-litter or dense grass. They can often be heard however for they are vigorous in defence of their territories and whenever rivals meet they scream at each other in high-pitched voices until one decides to run away or stays to fight it out.

Most records obtained during the survey were shrews found dead in one way or another. A surprisingly large number of shrews and other small mammal records were obtained from the remains of mammals trapped in discarded bottles. Again, cats frequently catch shrews and during the survey a number of valuable records were received from their owners. However, the most important source of records was the examination of owl pellets which proved that both common and pygmy shrews were present throughout the county. Unfortunately the water shrew is not accurately represented in owl pellets due to its more restricted habitat requirements and it is probably much commoner than our records suggest. A note in The Naturalist in 1886 describes this species as "exceedingly plentiful" in the county.

Lastly, dead shrews are often seen lying on paths in late summer and autumn in numbers sufficient to be noticeable. The explanation for this is that they have simply died of old age, for these tiny active mammals have a short life-span which at the most is only fifteen months.

References

Book: The Life of the Shrew, by Peter Crowcroft



Water Shrew



Lesser Shrew

The Mole Talpa europaea L.

The mole is very common and widespread, but it is seldom seen since most of its life is spent underground. It is a highly specialised mammal having immensely strong hand-like paws especially adapted for digging, and short velvet-like fur which resists wet and dirt and enables its owner to traverse its tunnels without getting damp and untidy.

The presence of moles is easily detected by the tall heaps of soil "mole-hills" which mark the moles' digging activities, and this was the method by which most survey records were obtained. Large mole-hills are known as fortresses, and under them the mole makes its resting nest in an enlarged chamber filled with grass and leaves. But nests may also be placed anywhere in a meadow, where they are not marked by an especially large heap of soil and one mole nest was found on the surface under a sheet of corrugated iron on a hedgeside.

Mole distribution is not mapped since moles were found in every tetrad searched, from coastal dunes to conifer plantations. The normal colour of a mole is dark-grey that appears black in some lights, but from time to time unusually coloured specimens turn up, and cream, piebald, buff and pure white moles are not rare.

References

Book: The Mole, by Kenneth Mellanby



Mole emerging from underground burrow

Bats

Bats form the order Chiroptera, the only mammals capable of true flight. Only seven of the fifteen species on the British list have been recorded from Lincolnshire and South Humberside to date. (The full list, with Lincolnshire records, is given below).

They are a difficult group of mammals to study for they fly only at dusk, when the light is too poor for accurate observation. However, even in good light few bats can be identified in flight with any certainty, and the only sure way of obtaining records is to catch and examine the bat in the hand. Most of the bat reports received in the survey have been confirmed in this way. The few exceptions are sight records of noctule bats, since the noctule is the one bat easily identified in flight because of its large size and powerful manner of flight.

A number of reports of pipistrelle and long-eared bat colonies were received via the County Council Health Departments, or direct from the householders and these were all investigated. Other colonies in buildings and tree sites were visited to net the bats for identification. Bird ringers working at dusk with mist-nets also provided valuable records of pipistrelle, whiskered, long-eared and noctule bats. Another source has been bat specimens killed by cars, caught by cats or found dead in other unusual situations and brought in for examination. Despite these efforts however, the bat survey is only just beginning. With the possible exception of the pipistrelle the known tetrad records certainly do not represent the true distribution, and for this reason the records are mapped on the 10 km. scale only.



Lesser Horseshoe bat.

The two horseshoe bats are in a different family to our other British bats (they have a nose-leaf instead of a tragus from the ear) and neither have yet been recorded in the county.

The British List (Lincs records marked*)

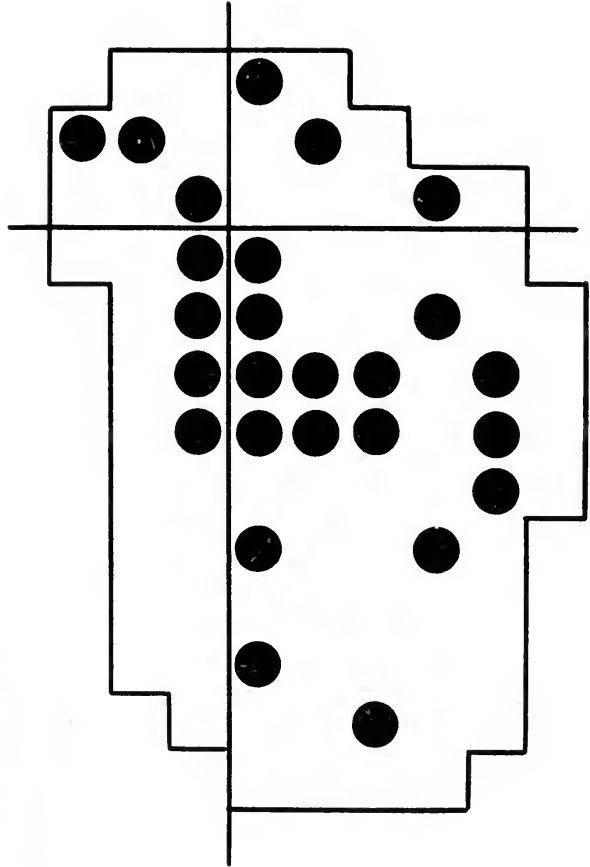
*Barbastelle	Leisler's
Bechstein's	Mouse-eared
Brandt's	*Natterer's
*Common Long-eared	*Noctule
*Daubenton's	*Pipistrelle
Greater Horseshoe	Serotine
Grey Long-eared	*Whiskered
Lesser Horseshoe	

Noctule Bat Nyctalus noctula

The Noctule is a large bat with a powerful and purposeful flight. In the air it appears to be about the size of a swift and it has a fifteen inch wingspan.

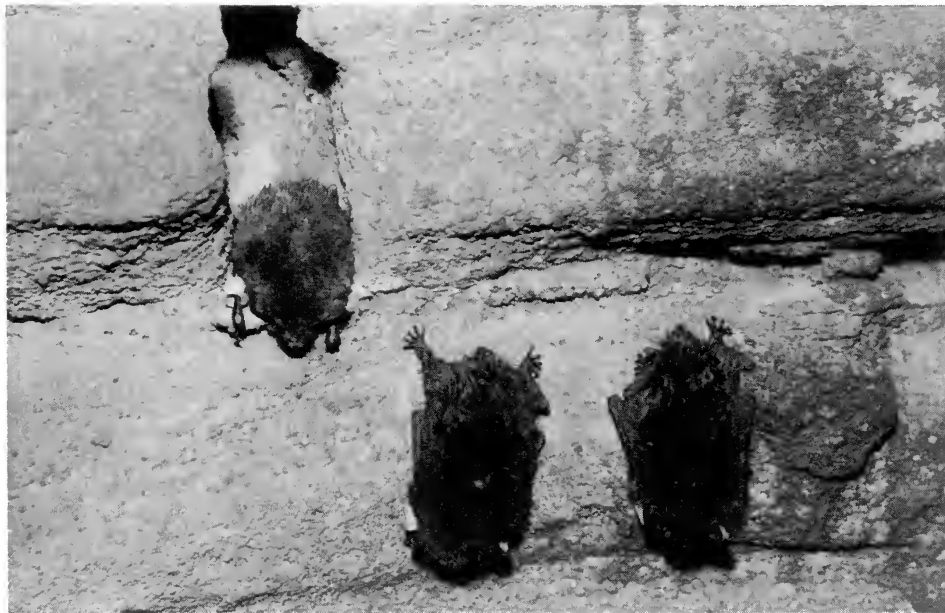
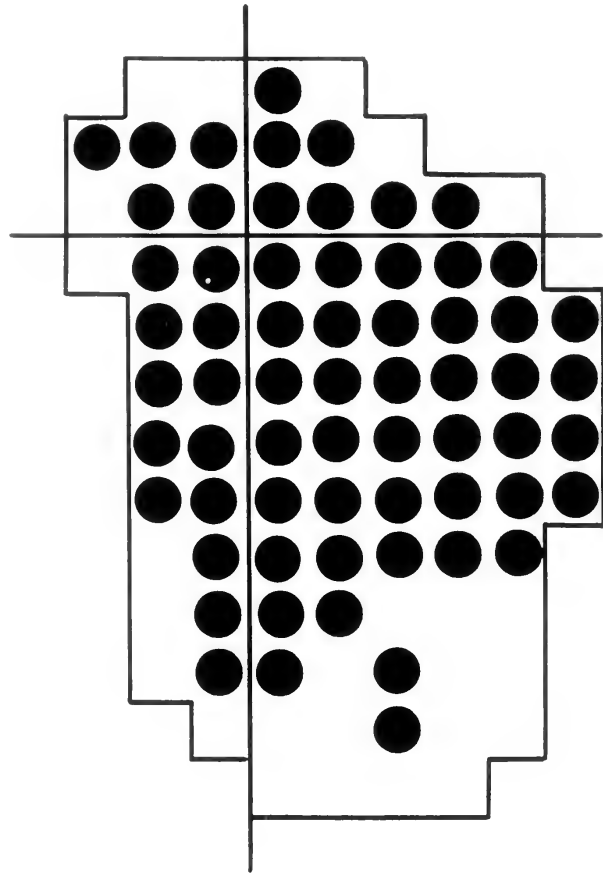
This bat can be seen almost anywhere in the county, though it favours districts with well-grown trees. It prefers to roost in tree cavities and is especially fond of taking over old woodpecker nesting holes for its living quarters. The bat photographed was netted near Doddington, where a colony was found roosting in a hollow birch tree. On one occasion 38 bats were counted leaving this tree for their nights hunting. Since then a number of Noctule colonies have been found in birch and beech tree sites, and others in cavities in buildings.

The Noctule is an easy bat to observe for it often comes out to hunt for insects long before sunset when the light is still good. It flies high and, for a bat, remarkably straight.



The Pipistrelle is our smallest and commonest bat species with a wingspan that rarely exceeds eight inches. This little brown bat can be found everywhere and probably no village in the county is without its Pipistrelle colony.

Pipistrelles are most commonly found roosting in house-lofts, church-roofs and cavities in buildings. Some of the colonies are very large and in Lincolnshire many colonies of over a hundred and one of 265 bats have been found.



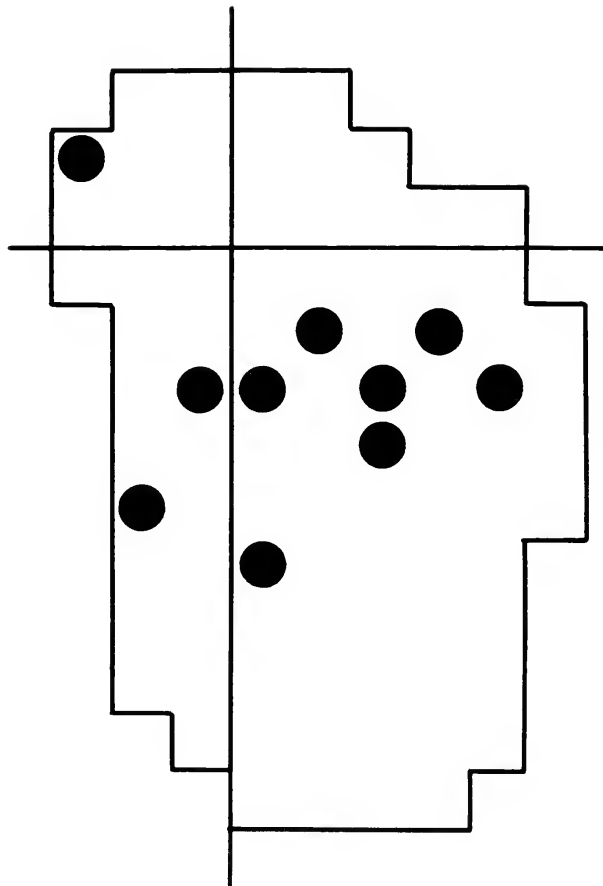
Pipistrelle bats. Note the metal rings, used for tracing movements, on the bats' forearms.

The Whiskered bat is another species that is probably more widespread than our records show for it is similar to the Pipistrelle in appearance and often frequents similar places. Unless an individual is captured or picked up dead and given a critical examination the Whiskered bat is frequently mistaken for the Pipistrelle.

Records of this species were long-awaited. In 1887 Caton Haigh described it in a survey for the Zoologist as "likely to be found". However there was still no record by 1912, when Blaythwayt, writing in Trans LNU, considered that it probably occurred in the county, since the species was known from Cambridge, Northants and Yorkshire. In fact the first record for Lincolnshire came in 1915, when one was picked up at Doddington.

The Whiskered bat is more solitary in habits than the Pipistrelle and all our Lincolnshire records are of single individuals. During the survey single Whiskered bats have been caught and released after identification in the following places - Stapleford, Scrivelsby, Horncastle, Sudbrooke, Reepham, Newball and Fiskerton. The other records are of individuals found dead.

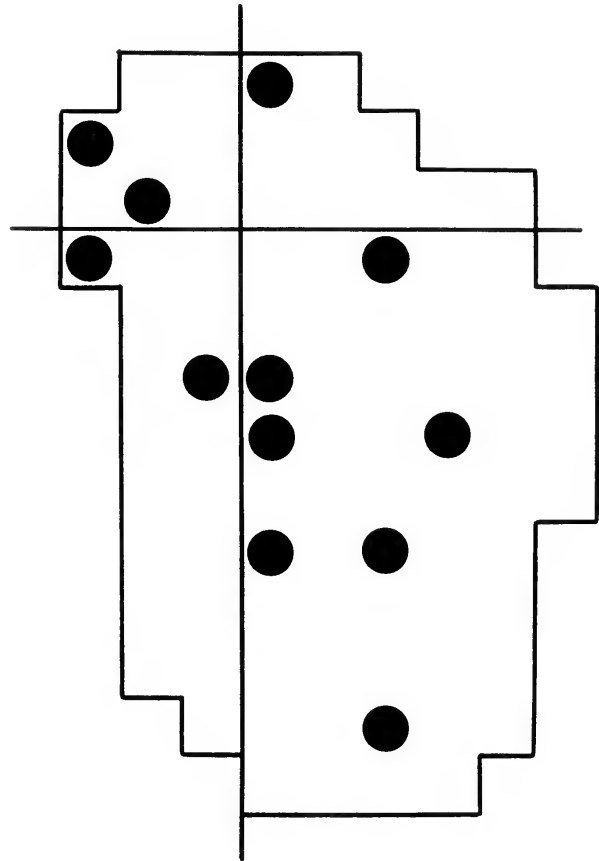
Brandt's bat. M.brandtii, which was added to the British List in 1972 has not yet been found in Lincs. It is very similar to the Whiskered, but slightly larger and redder on the back. The existence of this species makes it even more important that individuals are examined in the hand.



Daubenton's Bat Myotis daubentoni

The Daubenton's is another medium sized bat, dark brown in colour but appearing grizzled when in the hand for the bases of the hairs are darker than the tips.

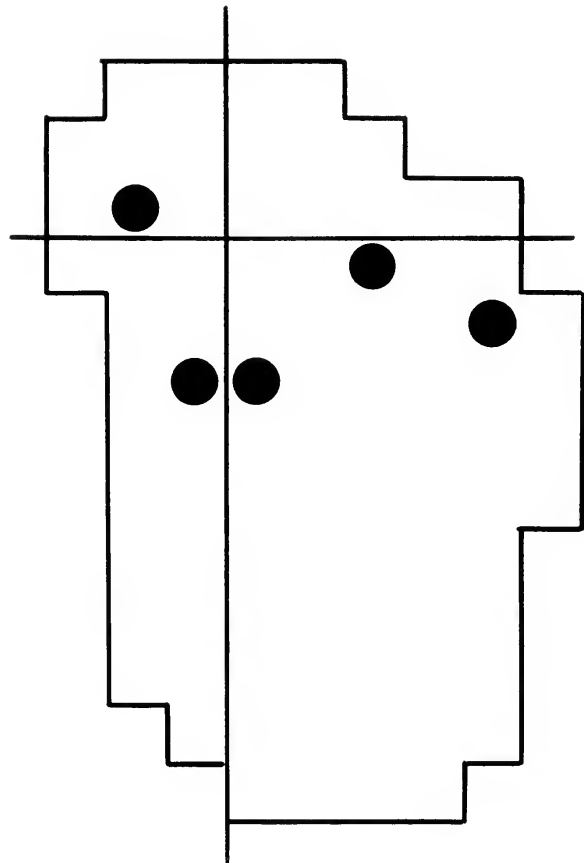
This species should be more common than our records suggest for it is common and widespread in England, Scotland and Wales. Sometimes called the water-bat, it frequents ponds, rivers and streams. It has a very distinctive flight pattern, flying on a regular beat low over the surface of the water.



Barbastelle Barbastella barbastellus

The Barbastelle is a dark coloured bat, its fur being almost black with grey or yellow tips. Its ears are joined together at their bases in a similar way to those of the Long-eared bat but much shorter - about half an inch in total length.

This is thought to be an uncommon species and it is little studied. There is only one record of a Barbastelle from Lincolnshire, a single individual found drowned in a water-butt at Holton-le-Moor.



Natterer's Bat Myotis nattereri

Natterer's bat is a medium sized bat, greyish-brown above and white below. Its distinctive feature is a row of stiff hairs along the outer border of its tail membrane. The Natterer's bat is very sociable, living in colonies that sometimes contain large numbers and often sharing roosting places with other species. In Lincolnshire it has been recorded from places as widely spaced as Scunthorpe and Saltfleetby.

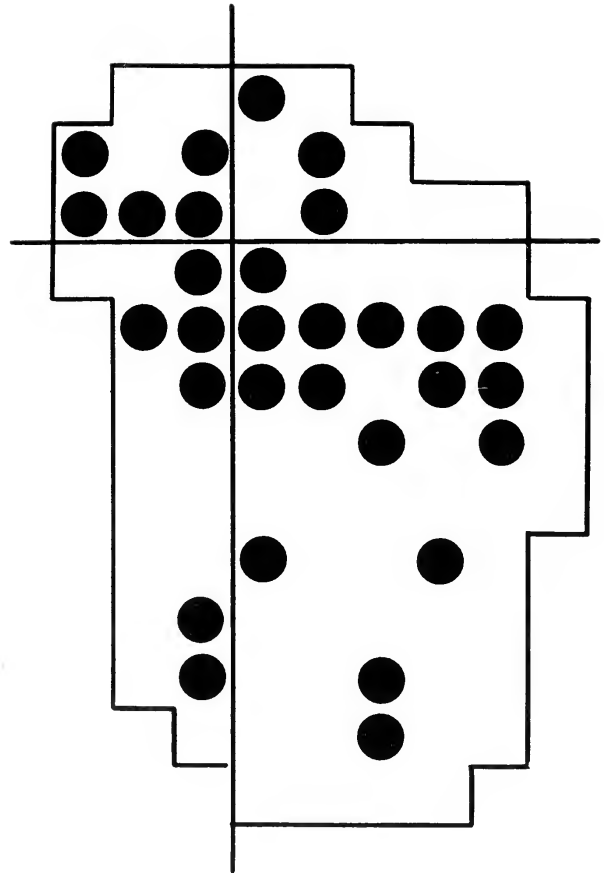
Records are lacking in the south of the county but this bat probably has a wider distribution than our present records indicate.



As the name suggests, this is a very common species which can be found anywhere in the county. It is also one of the easiest to identify for its remarkable ears are one and a half inches long and half an inch wide.

Most of our Long-eared bat records have been of single individuals, though at one house on the Lincolnshire Wolds a very fine colony of fifty adults and many young bats was discovered in the roof. Another interesting record of this species was that of two bats found hanging in an open log pile during November, at the side of a ride in Bardney Forest.

The newly discovered Grey Long-eared bat Plecotus austriacus is a much rarer species which is at present confined to the south coast of England. No specimens of this species have yet been found in Lincolnshire.



The Rabbit Oryctolagus cuniculus

In agricultural circles the wild rabbit is regarded as one of the greatest mammal pests with which the farmer has to cope, second only to the rat. In spite of attack by gassing, numerous natural enemies, and frequent outbreaks of the disease Myxomatosis which almost exterminated rabbits in some districts, this species has been recorded from every tetrad in Lincolnshire and is still very numerous in some areas.

In the past the Lincolnshire Wolds was one of the areas in the county that held great numbers of rabbits. Much of it was covered by rabbit warrens of 1,000 to 4,000 acres. John Cordeaux, writing in Trans LNU for 1895, stated that in 1798, in 18 miles from Louth to Caistor, ten miles were unenclosed except as warrens.

The total area then under rabbits was immense. On the Wolds these were chiefly the silver-haired, while on the Lincoln Heath the grey sort did best. On each thousand acres it was fair to kill two thousand couples annually. On the warrens between Gayton and Tathwell silver rabbit skins then sold for from 15s. to 21s. (75p-105p) a dozen.

References

The Private Life of the Rabbit
R.M. Lockley

The Brown Hare Lepus capensis

Like the rabbit, the brown hare is capable of causing damage to forestry and agriculture especially during spells of hard winter weather. However, even in its years of abundance its population never approaches anything like the numbers reached by the rabbit.

During the survey hares were recorded in every part of the county, although they were found to be thinly distributed in some areas and in others they were so plentiful that six or more could be counted in one field.

The saying "mad as March hares" well describes the courtship activities of the male hares. Their performance of high leaping, somersaulting and bouts of boxing could well be ascribed to mental unbalance.

The Bank Vole Clethrionomys glareolus

As its name implies, this vole is more partial to ivy-covered banks and hedge-sides than to open fields, although it often frequents the latter. Numbers of bank voles have been trapped in open beds of Phragmites being searched for harvest mice.

Although the bank vole is easier to trap than the field vole, the best and easiest way of proving its presence in an area is to examine nut samples or search for its remains in owl pellets. Like the field vole, this species was found in every part of the county.

References:

Forestry Commission publication: Voles
and Mice



The Short-tailed Field Vole Microtus
agrestis



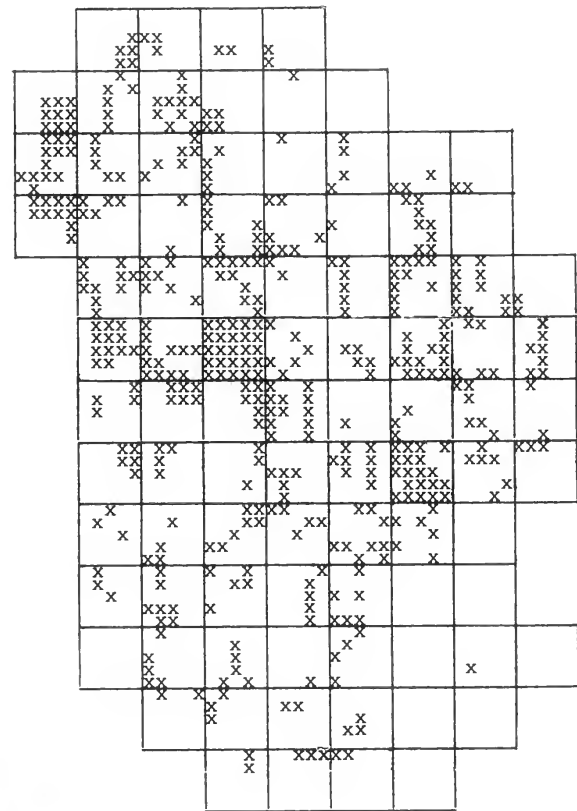
A very common small mammal which prefers to live out on open ground, where it makes an extensive network of tunnels just below the surface of the soil. It has fluctuations in its populations and in some years it can be a serious pest on agricultural land. It is always abundant and is found in every part of the county. Its remains are always present in the pellets of owls.

The Water Vole *Arvicola terpestris*

Often wrongly called the water rat, this is the largest of our voles. In addition to the common brown, a black variety is abundant in some northern districts.

Though often mistaken for the brown rat, the water vole is a harmless vegetable eater. In hard weather it will attack potatoes, turnips and carrots, but in summer it lives on duckweed, pondweed, roots of water-lilies, marsh marigolds, flags and large horsetails.

The nest is usually placed in a cavity in the burrow but occasionally may be found above ground. Water voles have a good many enemies; otters, stoats and weasels constantly prey upon them and among the birds, owls and herons are their principal foe. Many of the pellets thrown up in local heronries consist entirely of the fur of water voles. Certain large fish such as eels, pike and trout will also capture water voles as they swim across the water - pike have often been seen in the act of taking them.



Water Vole

The Coypu *Myocastor cypus*

The coypu is a large rat-like rodent that is a native of South America, where it lives in and around swamps, lakes and rivers. The big demand for its soft, dense fur, called "nutria" encouraged fur-farmers to import coypus into Britain, where they have now become well-established in the wild in Norfolk and parts of Suffolk due to fur-farm escapes. In Lincolnshire however, the only confirmed reports of wild coypu are from Holbeach marsh and the Spalding area.

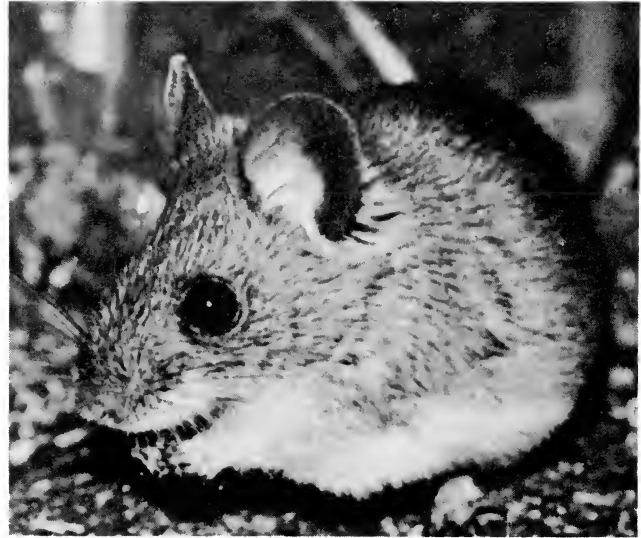
Coypus feed mainly on vegetable matter and the best indication of their presence in an area is in the extensive damage that they cause to reed-beds and other waterside vegetation.

The Wood Mouse Apodemus sylvaticus

The wood mouse, also known as the long-tailed field mouse, is very common everywhere. They are mostly found in woodlands or hedgerows but they can also be found in open fields, parkland or gardens, and were recorded throughout the county. Woodmice are nocturnal and during the daytime they remain under cover. However, because of this they are commonly found in owl pellets - one of the chief sources of information on this species in the survey.

Individuals can often be studied by putting down corrugated iron sheets near woodland - the mice soon use these sheets as shelters and sometimes build nests and breed beneath them.

In winter woodmice often use dis-used birds nests as feeding tables, carrying up nuts and berries, some of which they store. Some of these old birds nests are also roofed over with moss and used by the mouse as a winter nest. These winter nests and feeding sites were also used to confirm presence of the species in a particular tetrad.



The Yellow-necked Mouse Apodemus
flavicollis



The yellow-necked mouse is closely related to the wood mouse but it is larger and more brightly coloured, usually with a distinctive complete yellow neck collar. Because of the possibility of confusion with brightly marked members of the common species, actual specimens or colour photos were required to confirm identification during the survey.

In the past, yellow-necked mice have been reported from Gibraltar Point, Caistor and Winteringham, but during the survey only two records were received. The suspicion remains that this species is under-recorded but an intensive live trapping campaign would be required to prove it.

The Dormouse *Muscardinus avellanarius*

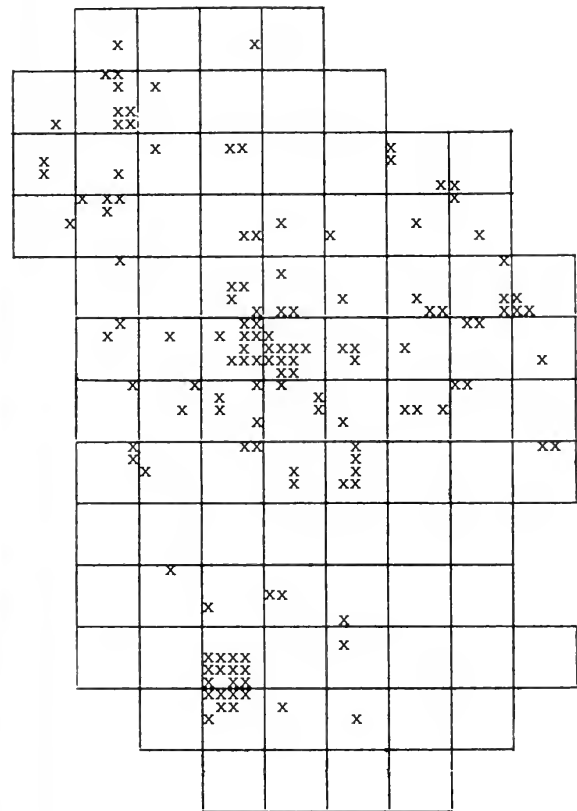
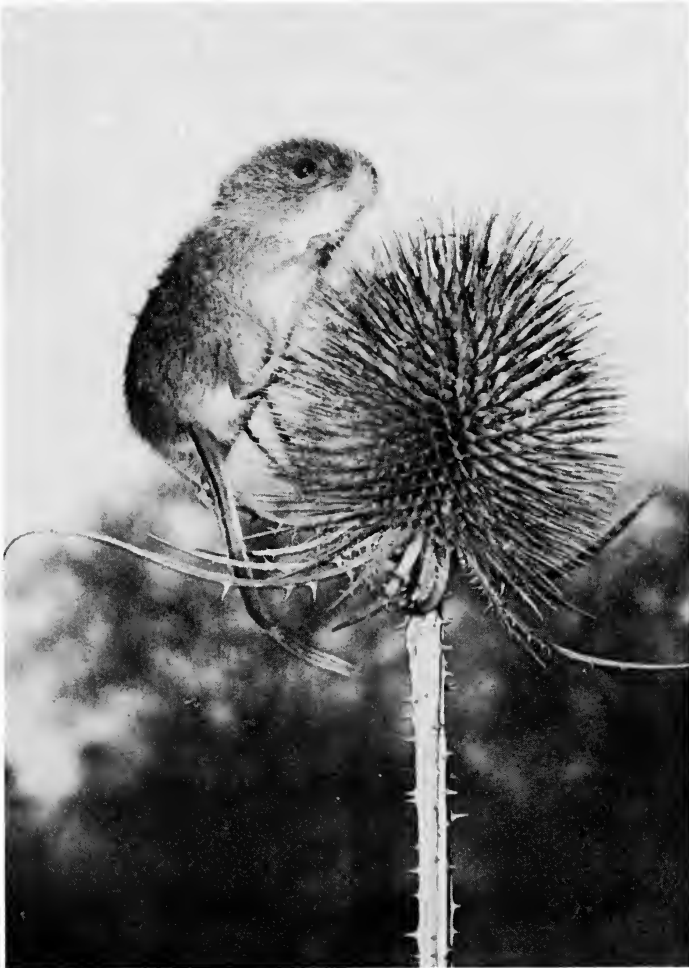
The dormouse is an attractive little mammal about the size of a woodmouse but it has a snug rounded appearance with dense sandy-brown fur and a thickly furred tail.

In Britain the dormouse is fairly sparsely distributed and there seems to have been a considerable decline in its numbers over the last 50 years. It is a vegetarian feeder, living mainly on nuts, seeds, fruits and berries. It is traditionally found in hazel cop-pice where it often builds a circular nest of grasses and honey suckle bark above ground in a hazel bush.

The dormouse passes the winter in hibernation, beginning its sleep in late October and resuming its regular activities about the middle of the following April. In Lincolnshire it has proved to be our most elusive wild mammal and even past records are vague about its distribution. A report in the Naturalist for 1886 records that they were "found in the south-west of the county" and in 1905 they were "said to occur in the woods of South Lincs." Between 1900 and 1916 John Hawkins, in his natural history articles in the Grantham Journal also mentions dormice as one of the mammals found in the locality.

The most definite past record is that of Blythwayt (Trans LNU, 1912) who reported them from the Wragby woodlands and the woods near Skellingthorpe and Doddington. He also repeated the report of their occurrence in the woods between Grantham and Bourne.

An extensive search in recent years has failed to produce any evidence of the existence of dormice in the county. However from time to time we still receive unconfirmed reports from various parts of Lincolnshire and as the dormouse has recently been rediscovered in Leicestershire and other counties south of our boundary there is still some hope of this interesting and attractive little mammal being rediscovered in some Lincolnshire wood.



Harvest Mouse

The Harvest mouse is a delightful little mammal; it is our smallest rodent and an adult weights from three to six grams. Its general colour is greyish-brown, merging into rich sandy-red or orange about the hind quarters. This tiny mouse is a great acrobat, running and climbing among tall plants with the greatest ease and frequently using its long prehensile tail for gripping and balancing.

During the summer months the harvest mouse makes a spherical nest of woven grass or reed which is suspended two to three feet above the ground in vegetation. *Phragmites* reed-beds are used both in summer and in winter and harvest mouse nests have also been found in scrub hawthorn and blackthorn bushes where they may be up to five feet above the ground. Winter nests in grassland or reed-beds may be on or under the ground and these tiny mice are also fond of building their winter nests among piles of straw bales.

In Lincolnshire the harvest mouse was regarded as rare until a few years ago, being known only from the Scunthorpe and Horncastle areas. However, an examination of owl pellet samples from various parts of the county showed it to be more widely distributed than had been thought and after careful searching the harvest mouse has now been found throughout the county and in some districts it is even common.

References

- Trans LNU: A Preliminary Report of the Distribution of the Harvest Mouse in Lincolnshire Vol XVII No. 2 1969
The Harvest Mouse: Current Distribution & Nesting Habits. Vol XIX No. 2 1977

Squirrels

Two different kinds of squirrels are found in Britain. One is the native red, and the other the introduced American grey. Unfortunately the grey squirrel is now the commoner of the two and our native red squirrel has become quite rare in recent years. A survey of the distribution of the two species in Lincolnshire was carried out in 1944 and reported in the Journal of Animal Ecology (15, pp 82-92) and Trans LNU (Vol 11, No.3, 1946). The survey was based on parishes and the results have been converted to 10 km squares as shown. At that time the grey squirrel had crossed the Witham only at Coningsby (TF 25) and was not known from the north of the county. (The record from TF 46 was a single squirrel, thought to have been introduced deliberately.)

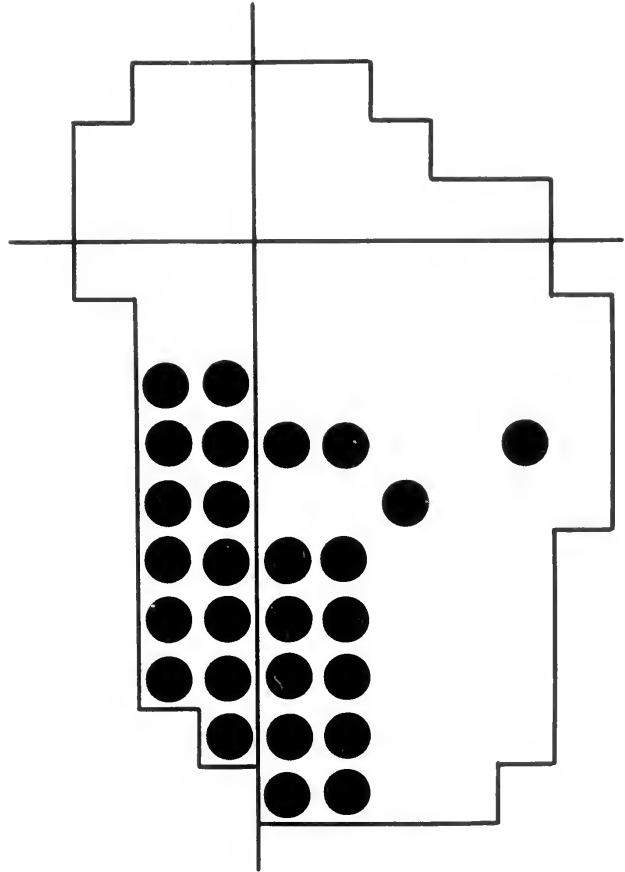
Apart from sightings, in the current survey squirrels were recorded in some parts of the county from the evidence of dreys, and also signs in the form of neatly split hazel nuts and the remains of pine cones littering the ground under the trees in pine plantations. Red squirrels were recorded from sightings only, with the exception of one skull found in an owl pellet! Although this may have tended to underestimate their distribution, they were very actively searched for in their previously known haunts.

Many people think that squirrels hibernate for the winter but in Britain this is not so, and both our squirrels can be seen at all times of the year, even when snow is covering the ground.

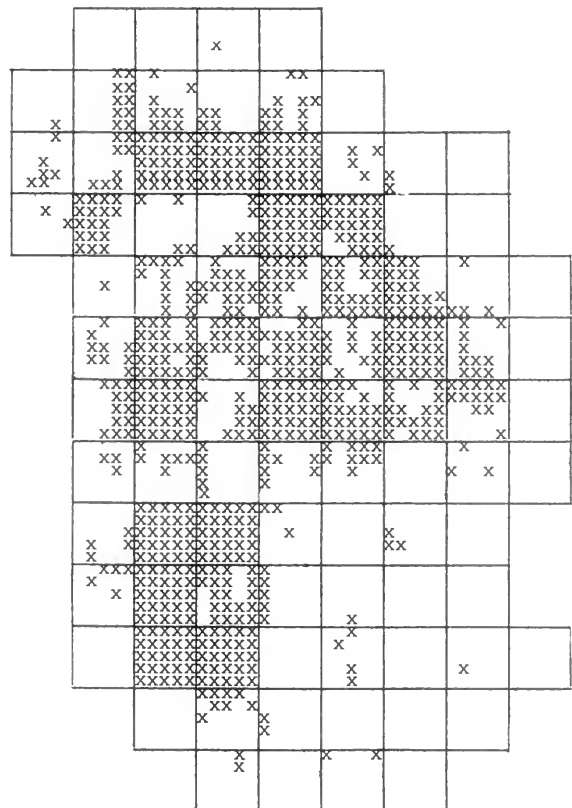


References

Squirrels M. Shorten
The Grey Squirrel Middleton



Grey Squirrel
Distribution in 1945 (above)
and during present survey (below)

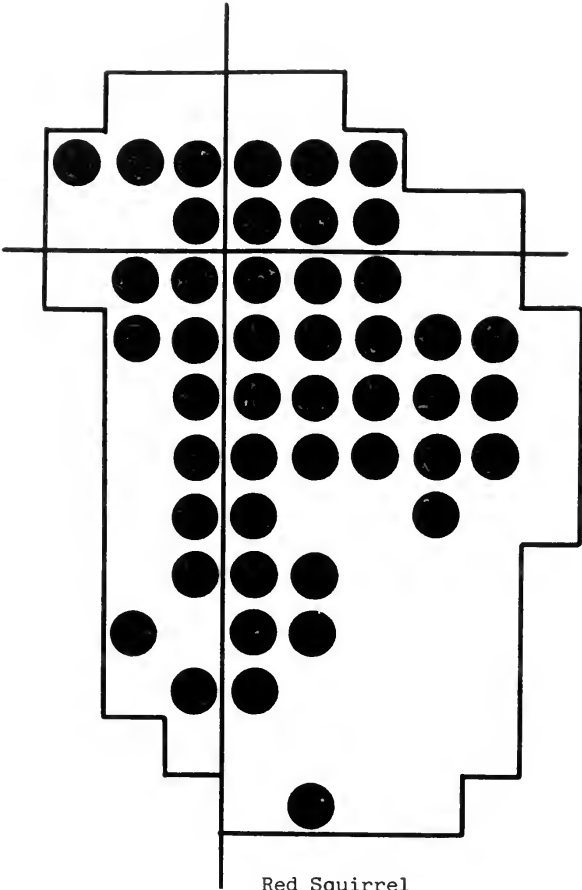


Grey Squirrel

The Red Squirrel *Sciurus vulgaris*

The red squirrel is one of the most beautiful of all our wild mammals. Its attractive red coat and fine bushy tail, together with its lively ways and playful habits have made it a general favourite with most animal lovers. Red squirrels prefer coniferous woods and are especially fond of the seeds of pine trees. They also feed on other seeds, berries, nuts and fruit, and may occasionally take the eggs of birds.

The tetrad map shows all records of the species in the last decade. Areas occupied between 1970 and 74 are shown by an x; those which still held red squirrels between 1975 and 79, by an •. Most of the recent sight records have come from the Laughton Forest area and it has gradually disappeared from most other parts of the county in recent years.



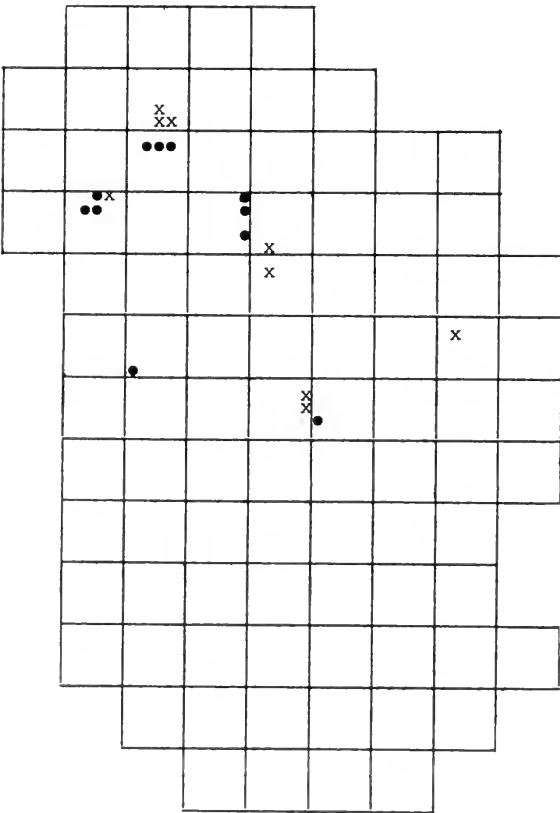
Red Squirrel
Distribution in 1945 (above)
and during present survey (below)

Grey Squirrel *Sciurus carolinensis*

Whatever may be said about the red squirrel, there is not much doubt about the character of the introduced grey, and it is now classed as a pest almost as serious as the rat or rabbit. Its food is similar to that of the red, but it takes eggs and young of birds much more regularly and does considerably more damage to trees by stripping them of bark.

The earliest records for Lincolnshire were both for parishes in Kesteven in 1935; Folkingham first, and then Leadenham. By 1937 a further 6 areas had reported grey squirrels, and by the 1944 survey all of Kesteven had been colonised. By 1978 all but coastal Lindsey also had grey squirrels, and there were even a few records from the fens.

Unlike the red squirrel the grey prefers to live in broad-leaved woodland, but it is common in woodland, parkland, orchards and gardens in almost every part of the county, as the tetrad map shows. It also comes well into towns, provided that there are parks or gardens. Numerous grey squirrel corpses can be found displayed on gamekeepers' gibbets in many parts of the county.



Red Squirrel

The Brown Rat *Rattus norvegicus*

This animal inhabits both town and country districts in great numbers and is found in every tetrad. It is undoubtedly the most troublesome and numerous pest of the countryside, living in buildings, hedgerows and corn stacks. Considerable damage is done by the animals eating and spoiling food, and since they also carry disease organisms their presence is a definite health hazard.



The Black Rat *Rattus rattus*

Previous to the introduction of the brown rat this species was common everywhere and is still often called the Old English rat. Its habits are very similar to those of the brown rat and fortunately the black rat is now an uncommon species confined to island and port localities.

A report in Trans LNU for 1912 recorded that, according to Max Peacock the ratcatcher in Bottesford caught 5 or 6 there in 1856, the last known from there. They still existed at that time "perhaps as an imported species" in the neighbourhood of Grimsby Docks. The last record for the county is from the same area in 1966 (figures kindly supplied by the Grimsby Port Health Authority).

<u>Year</u>	<u>Nos. found on Vessels</u>	<u>Nos. found on quays and land</u>
1946	391	-
1947	703	-
1948	212	5
1949	167	215
1950	205	-
1951	84	-
	<u>Nos. found in Ships from Foreign Parts</u>	<u>Nos. found in Trawlers and Local Vessels</u>
1952	18	123
1953	17	73
1954	-	109
1955	-	175
1956	10	105
1957	-	153
1958	-	179
1959	20	290
1960	-	261
1961	-	252
1962	-	83
1963	-	24
1964	-	12
1965	10	-
1966	60	-

Notes:

1. A change in the method of recording the data was made in 1951-52.
2. The figures for 1965 and 1966 refer to one infestation each of particular vessels.

The Fox Vulpes vulpes

The fox is common and widespread throughout the county and was recorded in every tetrad. They have been seen visiting dustbins in towns and in Lincoln foxes have even been recorded in the Arboretum. The fox has long been preserved for hunting, and the Burton, Brocklesby, Blankney and Cottesmore hounds all hunt regularly within the Lincolnshire county boundaries.

Out in the open country the foxes regular home is an underground earth and although it is well able to dig if the need arises it usually prefers to enlarge and adapt some rabbit burrow or take over a ready made Badger sett. Unlike the Badger, which is a clean animal at its sett, the foxes earth is often littered with the bones, feathers or fur of its victims and has a strong musky smell around its entrances. An observer lucky enough to see a litter of fox cubs playing outside their earth on a summers evening is privileged to watch one of the most pleasing sights in nature. To get into position to watch foxes needs even greater care than watching badgers and requires careful stalking, a regard for the direction of the wind, perfect concealment, and complete silence on the part of the observer. Foxes have a keen eye, ear and nose for danger of any kind and are usually quick to detect an intruder near their earth.



Foxcub (above)

and vixen (below)

References

Book: Town Fox, Country Fox
by Brian Vesey-Fitzgerald

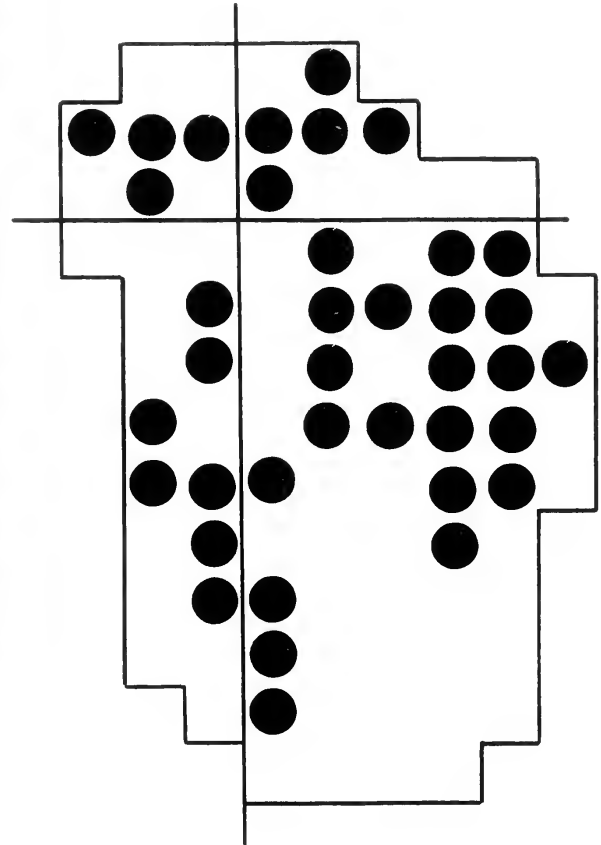




The badger is not a rare mammal, and in spite of continual persecution it is still fairly common in some parts of Lincolnshire. Its distribution here was well mapped during our investigations for the national Badger Survey in 1969, the results of which were sent in to the Mammal Society - to be used for scientific purposes only. At that time there were over 80 known setts in the county, in 23 10 km squares. When these areas were revisited during the present survey no traces of badgers were found in 6 of these squares. In some cases this disappearance is probably natural, but in others it may represent human intervention - as for example the sett previously known at Hartsholme, in grid square SK 96, now lost under a housing estate. To balance this, badgers were found in 18 grid squares where they were not known in 1969, and records for this survey came from a total of 92 tetrads.

The map shows 10 km square records only, so that the exact location of setts is not disclosed. The information obtained during the survey is being used for scientific purposes only.

Badgers were usually recorded from the finding of occupied setts - some of the larger setts have been in use for a very long time, and over the period of years tons of earth have been thrown out of some of the sett entrances. Other records came from road casualties, sightings and occasionally tracks (accepted from experienced observers only). A number of records were contributed by Forestry Commission officers.



On a visit by the LNU to one woodland area, the discovery of a badger nest built above ground was of special interest and on rare occasions badger cubs have been found in nests above ground. Although it was not known whether this nest had been used for breeding purposes, it had been used regularly by adult badgers as a resting place. Watching badgers at night can be good sport, especially if you try for photographs with the aid of flash. You must arrive at the sett well before dark to be in a good position for observation before the badgers emerge for their evening activities. Take advantage of any natural cover, or try to get off the ground into a tree branch. Always be certain that the wind blows from the sett to you, remain silent, and be prepared for a long wait!

References

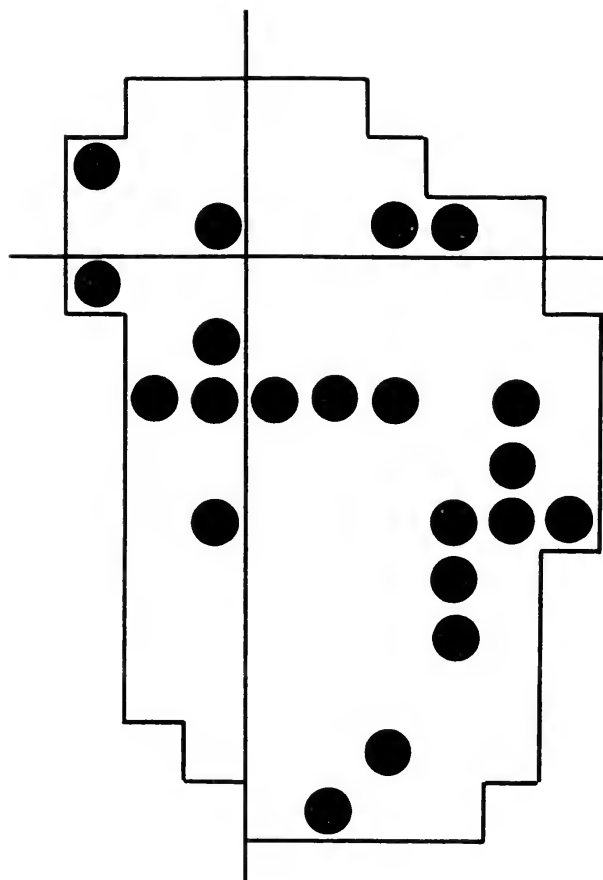
- Book: The Badger, by Ernest Neal
Other: Badgers in Woodland,
Forestry Commission booklet.

The otter is a nocturnal animal which travels great distances along waterways during its lifetime and is tied to one area only when cubbing. At one time otters were regarded as vermin, and a bounty was paid for their destruction. The Churchwardens accounts for Rigsby with Ailsby show that 6d in otter bounty was paid out in 1710, 3d in 1725 and 6d again in 1733. At North Cockerington a shilling was paid out in 1844 (reported in the Naturalist, 1889).

In 1886 a correspondent to the Field complained that otters had "never been so numerous within living memory" on the river Welland at Stamford and Deeping St James, and that the Gwash was "infested". In 1889, 5 were seen at Uffington on the river Welland. On the other hand, following the destruction of 4 in 1897-98 on the Waithe beck and at North Cotes, Cordeaux feared that the otter had "probably become an extinct species in North Lincolnshire". (The Naturalist, 1898) Max Peacock in the same journal, writing in 1900 reported otters to be "extinct at Bottesford, except for occasional wanderers". However, they were again found breeding in the Grimsby area in 1903-04, and youngsters were reported "all the year round in the river Ancholme" in 1905.

This pattern seems to have continued to the present time, probably due to the otter's wandering habits; they arrive in an area, possibly even breed, and are then not seen again for many years. Since otters are so scarce in the county, the map shows records on a 10km scale only. All accepted records back to 1970 have been shown, and otters have been reported from 33 tetrads in this time.

First reports of their presence in an area are usually due to the discovery of droppings, tracks, or the remains of a meal. However otters themselves have also been sighted on most of the river systems in Lincolnshire, particularly the Witham and the Bain, and on some of the large lakes in the county.



Breeding is known to have occurred on some rivers in recent years and there are a number of records of the discovery of dead adults and cubs in various parts of the county. Some of these are unfortunately due to road deaths. The decrease in the number of otters in this area is reflected in the table below, taken from the Journal of the Fauna Preservation Society, June 1974.

Otter Hunttable, showing finds/100 days hunting, Buckinghamshire pack*

1957	55
1967	44
1968	25
1969	21
1970	20
1971	16
1972	--

*hunts also in Lincolnshire

The Journal comments that two developments have adversely affected otters: great pollution of the Midland rivers and an enormous increase in coarse-fish angling.

References

Book: Watch for the Otter,
by Elaine Hurrell

Mink Mustela vison

The mink is an American animal that has been introduced into this country and farmed for its fur. The nearest fur-farms are in Yorkshire and near Peterborough. There have been occasional escapes from these, and there have been a few sightings of escaped mink in Lincolnshire but there is no evidence as yet that they breed in the county. Since they travel widely the distribution of sightings probably means very little and has not been mapped.

The mink is a carnivorous member of the weasel family and it looks rather like a slim, dark-brown ferret. It feeds upon birds, small mammals, fish, frogs and toads.

Pine Marten Martes martes

This large member of the weasel family is a rich brown in colour with a cream bib and a large bushy tail. It is a very agile animal and is able to pursue and catch a squirrel in a tree. It also hunts for birds, rabbits, hares and other small mammals.

The former home of this species in the county was the large central tract of woodland where it held its own until about 1875, and there are numerous records of its occurrence there in the Zoologist and elsewhere. Pine martens were very common in the large woodlands around Langworth and Wragby and the last record for the county was of an adult female trapped on April 26th 1905 in Fenwood in the parish of Caenby, only some eight miles distant from the Wragby woodlands.

In recent years the pine marten has again been seen in the county, being recorded from Willingham Forest, Laughton Forest and the Norton Disney area. All the known records are almost certainly introductions, but although no cases of breeding in Lincolnshire are yet known, this species now breeds in Yorkshire. As the pine marten is a great traveller it could well occur naturally in any of our Lincolnshire woodlands and may yet re-establish itself as a breeding species in Lincolnshire or South Humberside.

References

Pine Martens - Forestry Commission
Booklet

Wild Cat Felis silvestris

The wild cat must at one time have roamed in the ancient forests of Lincolnshire but today it is restricted to the wilder parts of Scotland. There have been no records of a true wild cat in Lincolnshire in recent times, though domestic cats which escape and run wild often grow large and become fierce and may easily be mistaken for a genuine wild cat. A cat shot at Bullington, near Wragby, in 1883 was the last one claimed to be a Wild Cat (in the Naturalist) though doubt was thrown on this by other correspondents in the Field, who thought it was more likely to be feral.

Stoat and Weasel

The stoat and the weasel are two very common small mammal predators that are widespread throughout the county. They both hunt as much by day as by night but they are quick to take cover and are seldom seen except when crossing roads. They are frequently found as road victims and are also observed alive feeding on the bodies of animals that have been killed by cars. Large numbers of stoats and weasels are still shot and trapped by gamekeepers every year and their bodies can be seen hanging on gibbets in many county woodlands.

Maps are not given for these species since they would reflect observer experience more than true distribution; not all observers were equally experienced at recognising the signs, but both species were found in every tetrad in which a thorough search was made. Both species were also recorded for every 10 km square.

Although both these predators will occasionally take game birds or their chicks and eggs they also do a vast amount of useful work by destroying large numbers of rats, mice and rabbits.

Stoat *Mustela erminea*

The stoat is the larger of the two and has chestnut brown upper parts and a creamy white underside; its tail is tipped with black. In northern parts of Britain the stoat often changes into a coat of winter white, in which only the tip of the tail remains black. White stoats are not common in the southern half of the country, but there have been a few pure white and some partial white changes recorded in Lincolnshire.

Weasel *Mustela nivalis*

The weasel is similar in appearance to the stoat but it is a much smaller animal and it lacks the black tip to its tail. For its size this blood-thirsty little mammal is probably the greatest fighter in the animal kingdom. It usually hunts for smaller game than does the stoat, but it can and does kill numbers of rabbits.



Road Casualties - Stoat (above)
and Weasel (below)

The polecat, although still comparatively rare, has undoubtedly increased during the last few years in parts of Wales and south-west England.

In Lincolnshire it was formerly common in many parts of the county, especially the Bardney woodlands, the Outmarsh and the woods around Louth. The last record in Trans LNU was of one near Bardney in 1926 and the species is now probably extinct. Feral ferrets however are recorded from the Wragby woods, the Skellingthorpe area and around Louth, and escaped ferrets may occur anywhere. Most domestic ferrets are white or cream in colour but a few of the darker polecat ferrets are practically indistinguishable from a wild polecat. This is generally blackish-brown in colour, with white ear-rims and muzzle, and usually with whitish markings on the forehead and body. This member of the weasel family preys on rabbits, hares, birds and other small animals.

References

Polecats - Forestry Commission booklet



Polecat ferret found dead on the road near Louth

The Common Seal Phoca vitulina



At least two thousand common seals live and breed on the sandbanks of the Wash. They wander from this area to all parts of the Lincolnshire coast and sometimes swim up rivers.

The Grey Seal Halichoerus grypus

The grey seal has also been observed in company with the common seal on the sandbanks of the Wash, but it is by no means common. It occurs as a straggler along the Lincolnshire coast and really prefers a rocky coastline for its true home. However grey seals have been known to breed in small numbers on Scroby sands, Norfolk, and pups still in their creamy-white baby coats have been washed up on the Lincolnshire coast.

Unlike the common seal, which gives birth to its young in June or July, female grey seals pup in September or October.

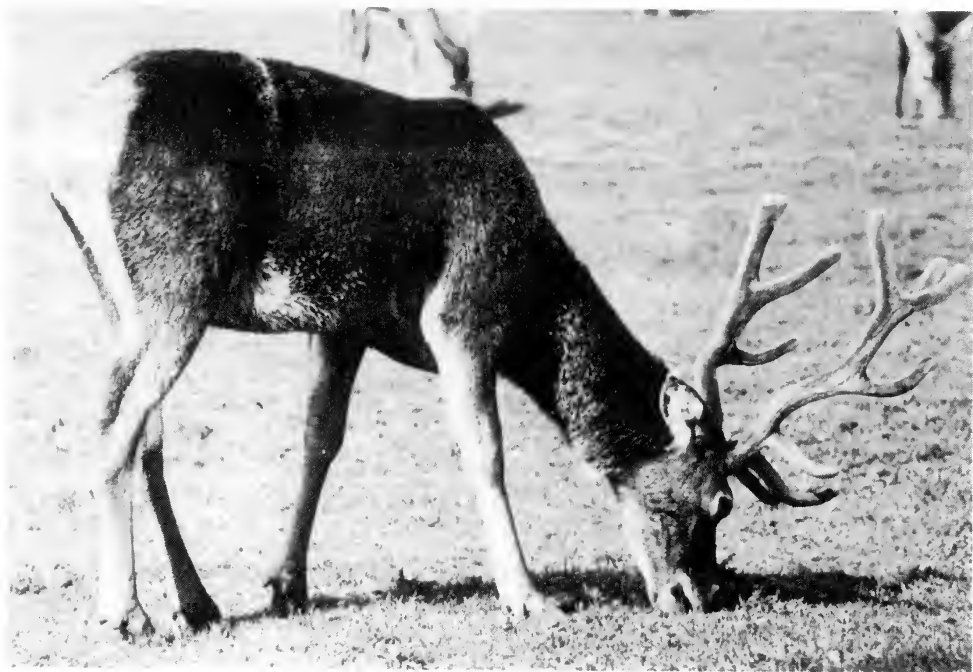
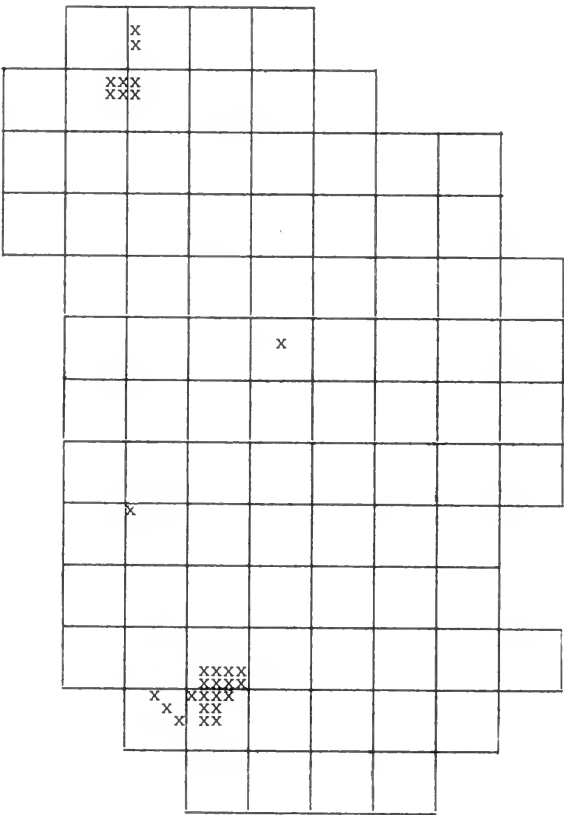
References

British Seals H.R. Hewer

The Red is our native deer and roamed wild in the county within historic time. For example, the Finningley parish register records that a great herd wandered over Hatfield levels and Lindholme in James I time, estimated at 1,000 head in 1607. This herd probably remained to the beginning of the 18th century, but then diminished. Max Peacock (in the Naturalist) considered them extinct in north-west Lindsey in 1900.

They were still kept in deer parks however, of which 9 were established within the county by 1867, though 2 no longer held deer by 1892. Today red deer are kept in deer parks at Grims-thorpe and Normanby, and at many others just outside the county. Red deer are less abundant in the wild than fallow, but they have been recorded in the woods around Wragby and in quarries near Ancaster and woodlands around the deer-parks mentioned. In these areas they are semi-domesticated and may be seen grazing in the fields.

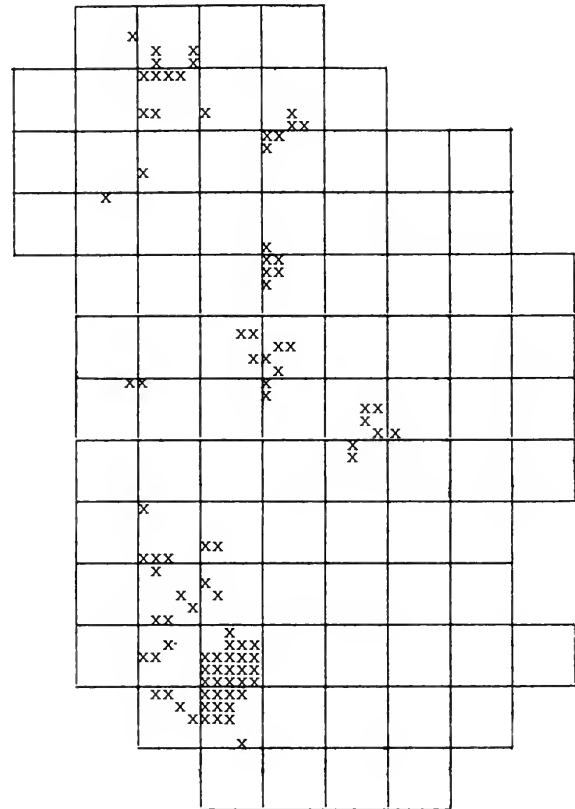
Survey records came mainly from forestry workers and farmers, with some from members of the public. Most records were of sightings, but records of cast antlers and red deer spoor were accepted from experienced observers.

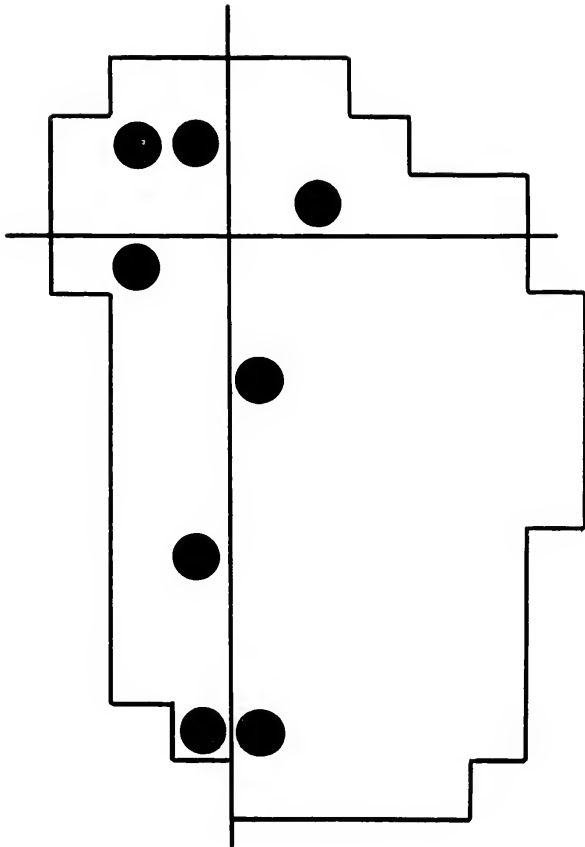


The Fallow Deer Dama dama

This introduced species is kept in a number of deer parks in Lincolnshire e.g. at Grimsthorpe in the south, Revesby and Scrivelsby in mid-Lincs, Worlaby and Normanby in the north. There have been many escapes and fallow deer have become established in the wild in some areas. During recent years they have been recorded in almost all the woods in the Bardney forest area, even if only passing through. They have also been recorded from Willingham forest and Bourne woods. Fallow deer are distinguished by their palmate antlers and by their rattling calls during the breeding season.

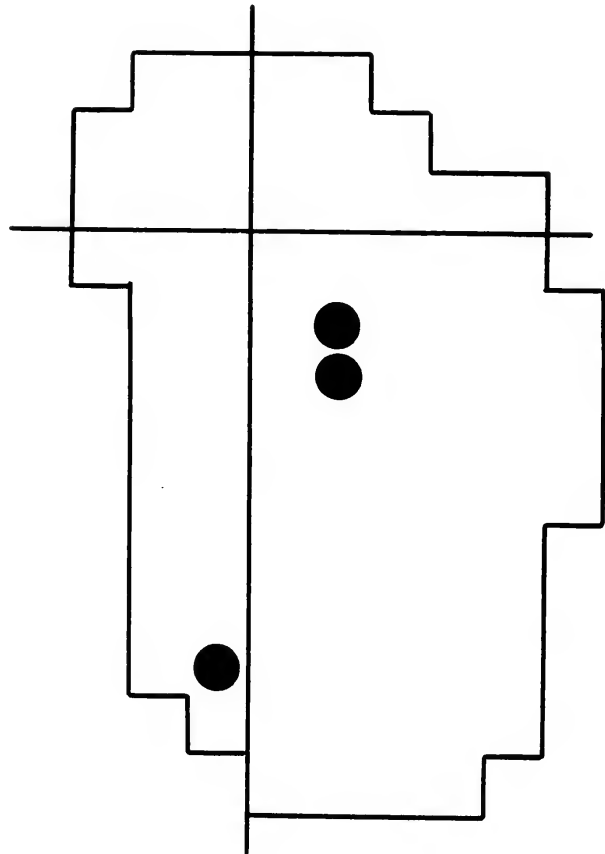
Records came from similar sources to those of red deer, though in its mainly woodland habitat, actual sightings were fewer. They are best recorded by observation at dusk or early morning or by a search for tracks in the mud along forest rides. Because of their more secretive habits, passing fallow deer in some areas may not have been recorded.





Roe deer Capreolus capreolus

Roe deer do not do well in deer parks and none have been kept in Lincolnshire. However, deer parks containing roe exist in Norfolk and in Scotland and wild roe are common throughout Yorkshire. In recent years there has been evidence that roe deer are beginning to infiltrate Lincolnshire. In the Bardney woodlands a cast antler was found in Newball wood, but all other records are of sightings.



Chinese Muntjac Muntiacus reevesi

This small deer, no bigger than a terrier dog, has protruding canine teeth and has become established in the wild in a number of counties. In Lincolnshire it has been recorded by Forestry Commission workers from Willingham Forest in the north and Bourne woods in the south, (though there is strong evidence that these were deliberate introductions).

Sika Deer Sika nippon

Sika deer are like mini red deer, being about half the size of the native species. They have been kept in deer parks at Normanby, and in Yorkshire and Norfolk. No escapes are yet known and there have been no reports of sika living wild as yet.

References

- | | |
|----------------------|-----------------------------|
| Wild Deer in Britain | Roy A. Harris and K.R. Duff |
| The Fallow Deer) | Forestry |
| The Roe Deer) | Commission publications |

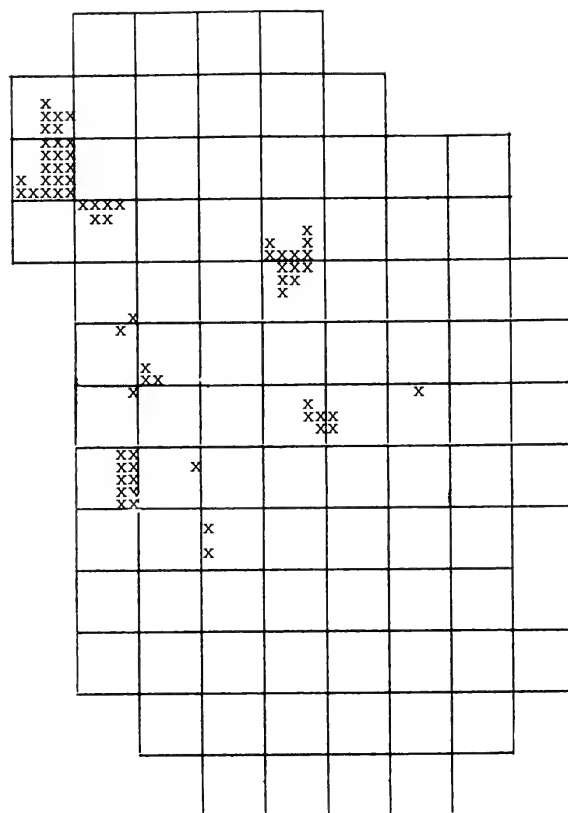
Adder Vipera berus

The adder is our only poisonous British snake. It is distinguishable by the dark zig-zag line on the back, with a V on the head. This snake is subject to much variation in colour and markings however, and sometimes markings are absent altogether. Generally speaking its ground colour is some tint of brown, olive or grey. The average adder is less than two feet in length, though the female is always slightly longer than the male and a few exceptionally long females have been recorded measuring up to two feet eleven inches.

The adder is more restricted in habitat than the grass snake, and in general it likes drier places. In Lincolnshire and South Humberside it is common and well-known on the dry heathlands around Scunthorpe, Market Rasen and Woodhall. The tetrad map shows the main areas of distribution, but all snakes are retiring and may be missed. The old records show that adders have always been less common than grass snakes in the county.

Unlike the grass snake, which lays eggs, the female adder gives birth to live young, from five to twenty being born in August and September. The young adders measure from six to eight inches at birth. They are fully independent and their mother takes little further notice of them.

An adult adder feeds mainly upon mice, voles and lizards and will also take small birds and amphibians whenever it can catch them. It retires into hibernation in autumn, and the best time to observe this snake is in April, for as soon as they reappear they bask in the spring sunshine, apparently more concerned with absorbing heat than in hunting for food. Large numbers of adders can sometimes be found basking in the sun soon after emerging from hibernation quarters, and most of the survey records came at this time.



Adder



The grass snake is usually olive-brown or olive-green in colour with black spots or narrow cross bands along its sides and a bright yellow collar around its neck, from which it gets its alternative name of Ringed Snake. It is completely harmless but if it is roughly handled it may well discharge an evil-smelling fluid at its captor. In Britain the grass snake reaches a length of four feet, but in some parts of Europe specimens over six feet in length have been found.

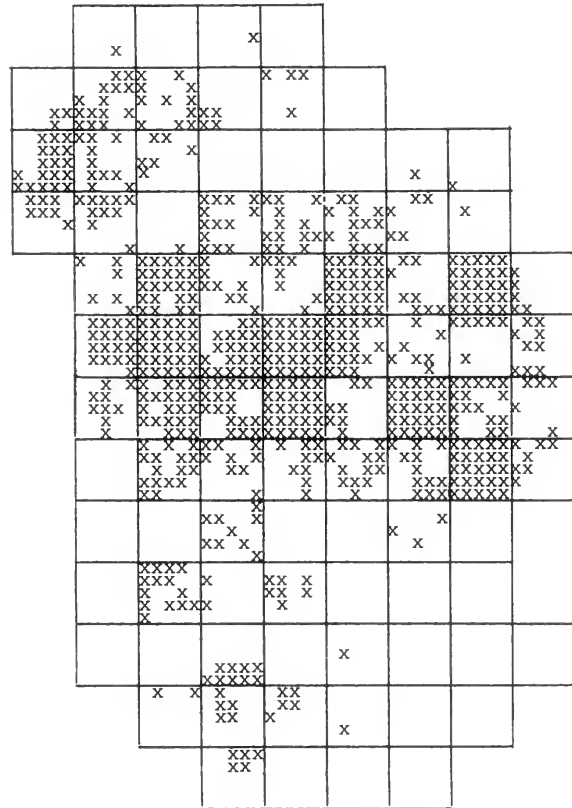
All records during the survey were of sightings, which are unlikely to be confused with any other species and were accepted from all observers. This method does depend though on the observer being in the right place at the right time of year and as with all secretive species, some will have been missed.

Grass snakes in Lincolnshire can be found in a number of different types of habitat and although they swim well and prefer to live in places near water they may also be found in dry situations far from the nearest water. Thus, the tetrad map shows well its occurrence in some river valleys, e.g. the lower Witham and some of its tributaries - the Bain, Barlings eau and Till. However it is also fairly common on the Wolds and not uncommon on some parts of the limestone heath.

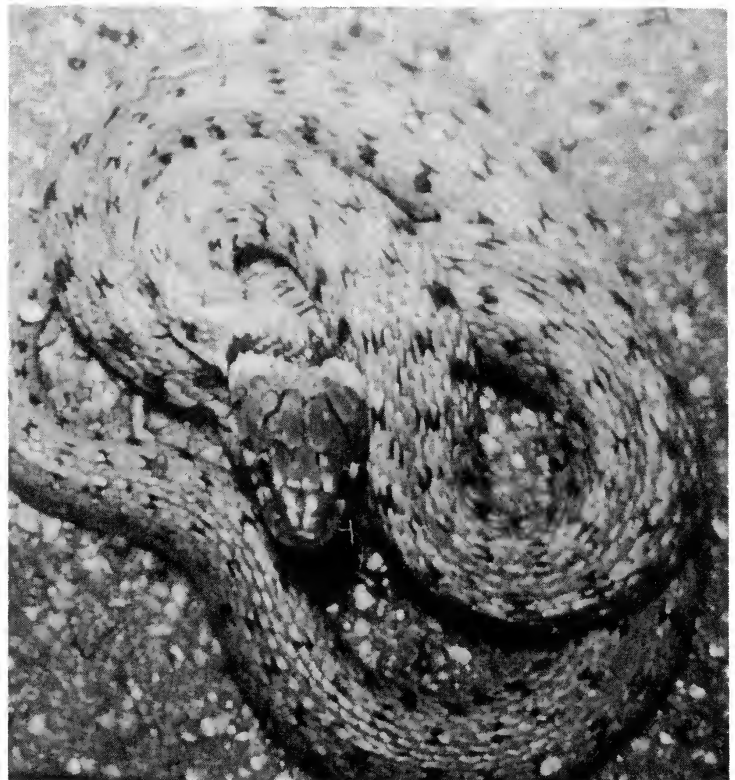
Frogs undoubtedly form the major part of the diet, but toads, newts, fish, mice and small birds are also taken. In 1881 a grass snake was hooked in the Witham by an angler fishing for perch with a frog.

The grass snake pairs in April or May and the female lays her eggs sometime between June and August. A young female lays from 8 to 10 eggs but a fully adult snake may lay from 30-40 eggs. The eggs are laid in piles of dead leaves or rotting compost where the heat generated assists them to develop. Another favourite place for egg-laying regularly used in Lincolnshire is in the heaps of sawdust left from logging operations in forestry Commission woodlands.

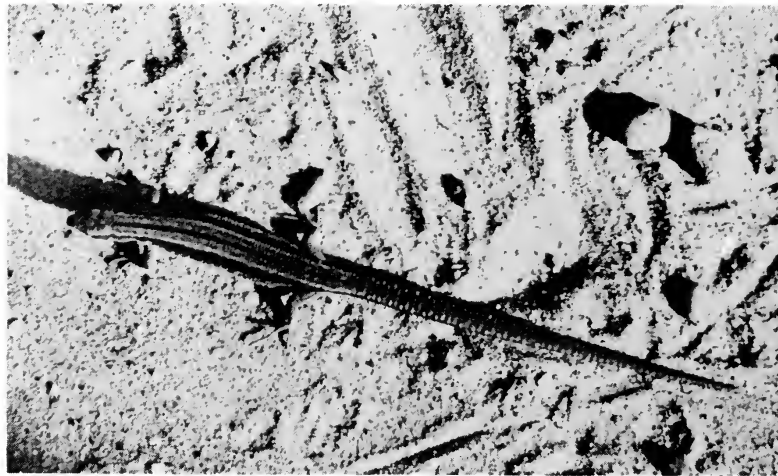
In October the grass snake goes into hibernation for the winter, hiding away in cavities in walls or in the ground. Occasionally large numbers of grass snakes have been found hibernating together in one cavity.



Grass Snake



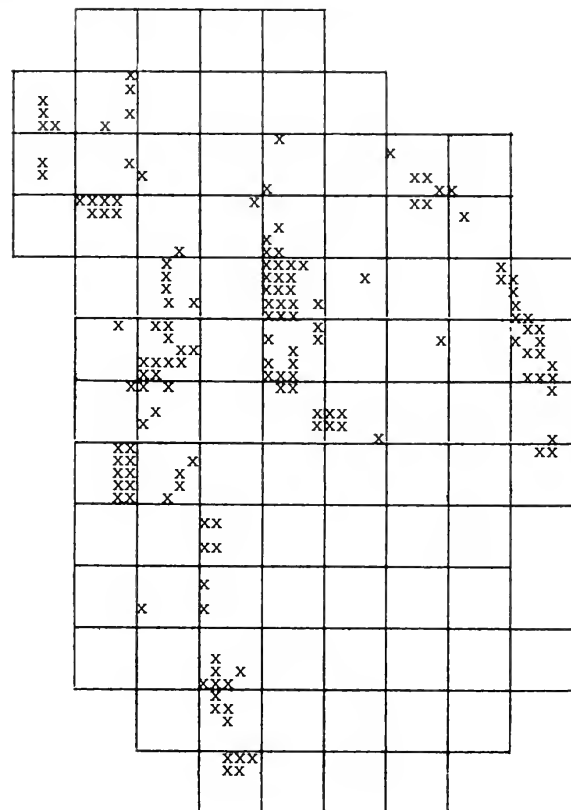
Common Lizard Lacerta vivipara



The common lizard is found throughout the county in a wide variety of habitats including heaths hedgerows, quarries, gardens and sand-dunes. Survey records came from sightings, often of basking specimens, and all such records were accepted. However lizards will quickly take cover from observers and only bask in good weather, so may be under-recorded in areas where they are uncommon.

An average adult measures about five inches in length and is usually some tint of brown. Colour and markings vary greatly in different individuals however and the ground-colour can be light yellow-grey to dark purple-brown.

The common lizard mates in April or May and the female gives birth to from five to eight live young sometime between June and September. The adult lizard feeds upon insects and other small invertebrates.



Common Lizard

Sand Lizard Lacerta agilis

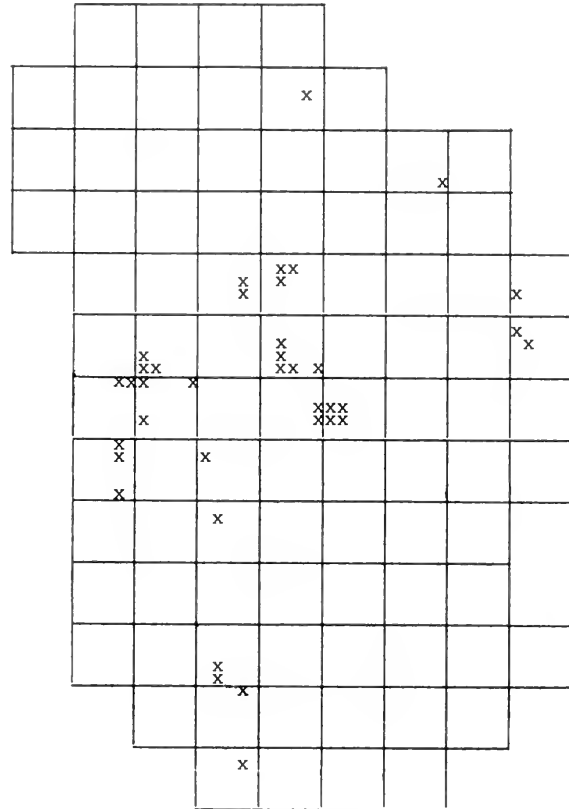
The sand lizard is noticeably bigger and bulkier than the common lizard, more brightly coloured and with a row of white spots down its side.

In the past the sand lizard has been reported from areas of the Lincolnshire and South Humberside coast. However it is some years since the last report, and since occasional common lizards can be very brightly coloured, the report is somewhat suspect.

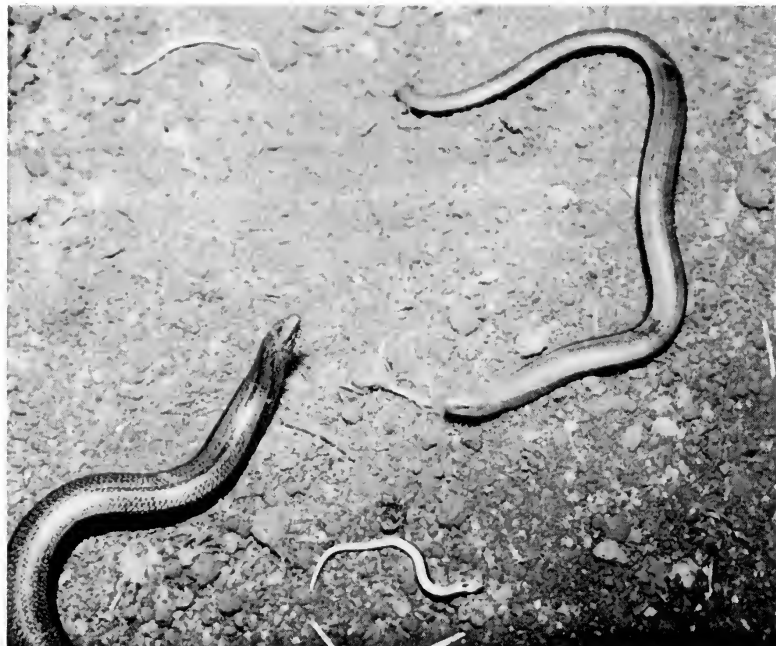
Slow-worm Anguis fragilis

The slow-worm is often mistaken for a snake and unfortunately some people will kill it on sight because of it, although it is a legless lizard and is entirely harmless. Indeed it should actually be classed as a gardeners friend for it feeds entirely upon invertebrates and its favourite food is slugs.

Although the slow-worm does appear in the daytime occasionally, especially during early spring and late summer this interesting lizard is mainly nocturnal in habits. It has proved difficult to find on survey, many records coming from chance sightings, and its distribution in the county is still not fully known; indeed it is difficult to estimate how far from complete the present known distribution may be. Slow-worms are found in a wide variety of habitats - woodland, heathland, agricultural land, and even on the coast - and since they are very secretive they could still be found almost anywhere.



Slow Worm

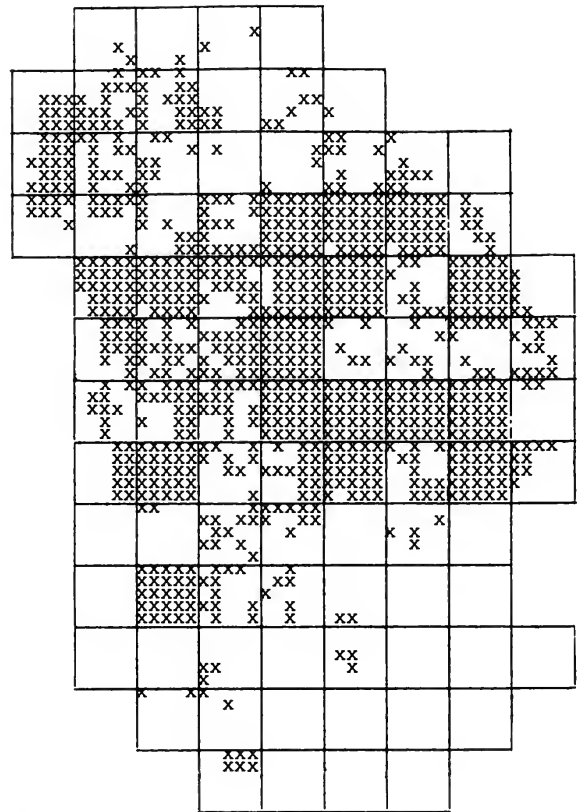


Common Frog Rana temporaria

Frogs may still be found in suitable areas all over the county in spite of the fact that all our amphibians have declined in recent years, due to loss of ponds and the adverse effects of toxic chemicals. Frogs like fresh, still-water ponds, but they are less choosy in their breeding sites than toads and almost any patch of water may be used, be it lake, ditch, or garden pond. Sometimes a frog will drop its masses of spawn in the most unsuitable places, such as a shallow temporary pool of rainwater, which dries up in the sun, destroying the eggs. Frogs spawn early in the year, often gathering in the ponds in February during mild weather, and their eggs have usually been laid by the end of March. After the breeding season adult frogs live among waterside plants near the pond until October or November when they hibernate in holes or under stones. Some even bury themselves in the mud at the bottom of ponds or streams to hibernate.

The best time to look for amphibians is in the spring and summer when they return to water to spawn. During the survey ponds, streams, lakes and even the static water tanks used for fire-fighting in Forestry Commission woodlands were searched for spawn, tadpoles and adult specimens.

A surprising number of frogs, toads, and newts however were found in dry localities far away from the nearest water and districts on the chalk wolds yielded far better results than was expected. The scarcity of records from the fens, on the other hand, is likely to be an accurate record. Certain fenland squares were deliberately searched very thoroughly, often with the help of local schoolchildren, but produced no amphibians.



Common Toad Bufo bufo

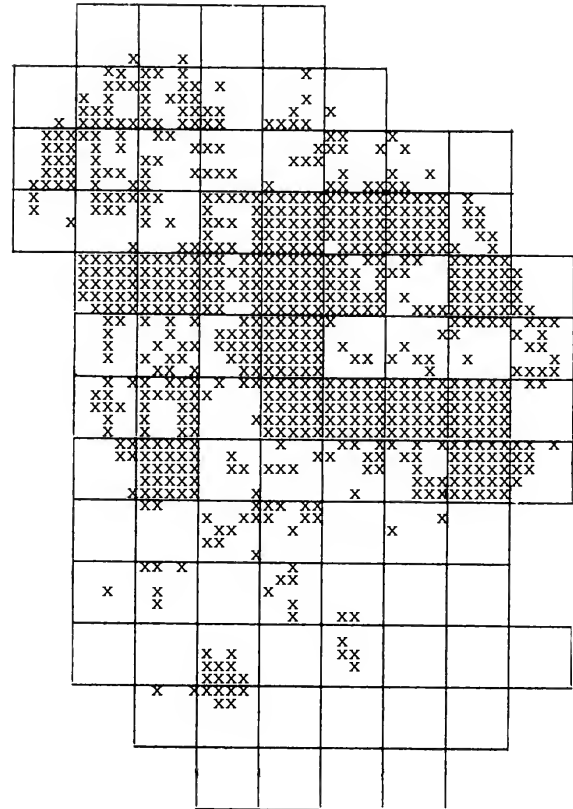
The common toad is widespread in the county and toads can be seen in numbers when they emerge from hibernation and head for their breeding ponds in April. Like other pond-breeding amphibians many are killed while crossing roads to reach their spawning grounds. Toads spawn later than frogs and arrive at the ponds in April-May, often as the frogs are leaving. They lay their eggs in long strings, unlike the mass of spawn produced by frogs.

Adult toads spend most of their life on land and although they prefer damp situations they are less aquatic than other amphibians and can be found in dry situations a considerable distance from water. They hibernate through the winter on land, holed up in cellars, rabbit warrens, compost heaps, etc.

Records for the survey came from sightings of adult and young toads, or the spawn, and frequently from road casualties. All records were accepted. (See also notes under Common Frog).

References

The British Amphibians and Reptiles -
Malcolm Smith



Common Toad

Natterjack Toad Bufo calamita

Distinguished from the common toad by a bright yellow stripe running down the middle of its back, the natterjack is a rare species in the county. It was formerly not uncommon right down the coast; a correspondent in the Naturalist World, October 1886, found that natterjacks were "numerous in the marsh drains at Mablethorpe" and Roebuck in Trans LNU in 1910 reported that the species "occurs plentifully on the coastline". The following year it was "seen in numbers at Skegness".

Now the natterjack is found only at one locality on the north Lincolnshire coast, which has not been mapped for security reasons. Some years ago it was deliberately re-introduced at a second site, but this was not successful.



Common Toad



Natterjack Toad

Two species of newt, the Smooth newt Triturus vulgaris and the Great Crested newt Triturus cristatus are reasonably common in the county, having suffered less from toxic chemicals than frogs or toads. A third species, the Palmate newt (T. helveticus) is said to have been found at two sites in the county but these are very old records and no palmate newts were discovered during the survey.

Our two common species have very similar habits and may be found in the same places though, as the maps show, the smooth newt is apparently distributed more widely than the great crested, even spreading down into the fens, where none of the amphibians are well-represented.

They can easily be told apart since the great crested is twice the size of the smooth (140-160 mms, compared with 80-90 mms) and is a deep brown-black in colour on its back, with a bright orange, black-spotted, belly. Smooth newts are an olive-green to brownish colour, with a lighter, yellowish belly, and are covered all over with black or dark-green spots. Males of both species have a crest during the breeding season.

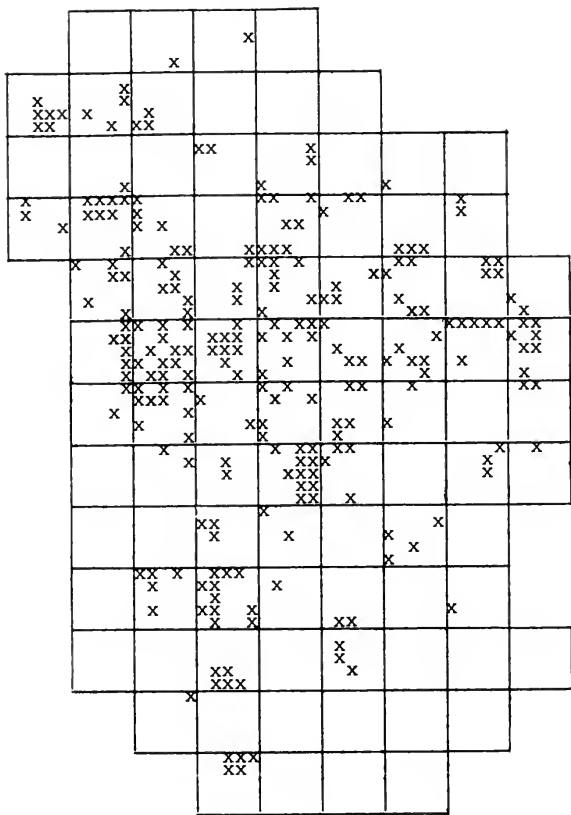
All survey records are of sightings, though all but the most experienced observers were required to catch and examine the newt in the hand before identifying it. For this reason some records may have been missed, but the maps are considered to show the general distribution reasonably well, if not all individual sites.

The breeding and courtship displays of newts are very interesting to watch. The male newt swims around the female in the water and shows off his bright colour and decorative crest, and rapidly vibrates his tail. Traditionally newts return to their spawning grounds in April, but in mild weather they may be in the ponds much earlier than this. The female newt lays her eggs individually, attaching each one to the leaf of a water plant. In places where there are no weeds, such as the static water tanks on Forestry Commission ground the females fasten their eggs to floating twigs, leaves or grass overhanging the sides.

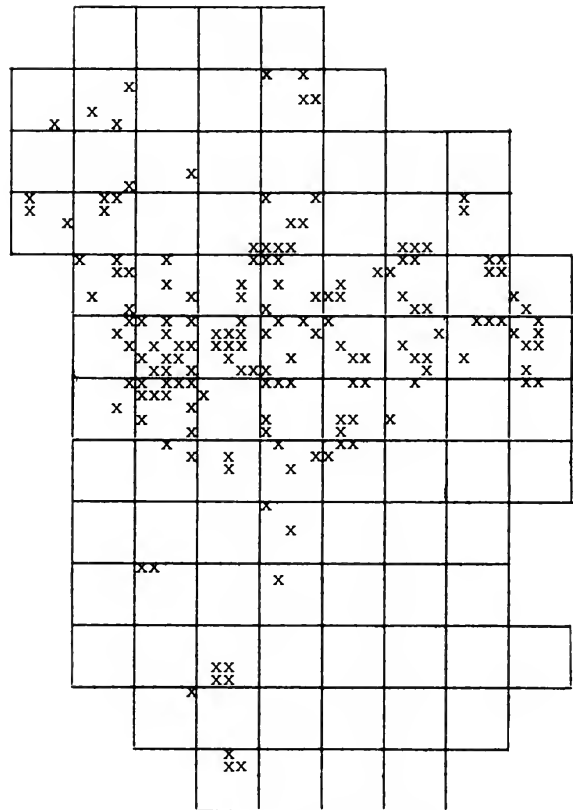


Smooth Newt

Compared with frogs and toads the newt spawning season is much prolonged, so that they can be found in ponds for much longer and some remain in water all through the summer. Young newts take three to four years to reach full size and sexual maturity. They may remain in the pond all that time, or they may leave it when they metamorphose (which takes about 5-6 months) and not return until they are ready to breed.



Smooth Newt



Great Crested Newt

APPENDIX

All observers taking part on the survey were issued with a set of general instructions, followed by special instructions on the signs to look for in each quarter. These are given here for the benefit of readers who may be encouraged to fill in some of the gaps. Any records will be very welcome; 10 km square record sheets may be obtained from the Natural History Dept., City and County Museum, Lincoln, by anyone wishing to try recording a whole square.

Recommended Books

It is strongly recommended that you acquire a good book. One of the best for this purpose is "Mammals of Britain, their tracks, trails and signs" by Lawrence and Brown, published by Blandford. If you are really interested in wild mammals you will find it invaluable. Other good general books are:

The Handbook of British Mammals	G.B. Corbet & H.N. Southern
British Mammals	L. Harrison Matthews
Collins Guide to Animal Tracks and Signs	Preben Bang & Preben Dahlstrom

More specialised books on particular species or groups are given with each animal's entry.



General Hunting Instructions

The following are the main ways to look for small animals

1. Sight records of living animals. These are acceptable for all the amphibians, if caught and examined in the hand and for all reptiles except sand lizard, which must be reported and confirmed (see Note 1 below). Also acceptable for all larger mammals, e.g. badger, fox, rabbit, hare, hedgehog, squirrels, mole, stoat and weasel (remember that the stoat is the larger of the two, and has a black tip to its tail. (See also note 4 below). Small mammals - mice, voles, shrews, etc. unless caught and examined in the hand, should not be recorded on a live sighting alone.

2. Bodies. i) Road casualties. This is particularly useful for larger animals, especially hedgehogs. Smaller animals may occasionally also be found, and any which are fresh and complete enough to allow positive identification are acceptable.

ii) Gibbets. Not infrequently, the gibbets of farmers and keepers may be found. These may have bodies of any of the following - stoat, weasel, rat, hedgehog, grey squirrel. If recognisable, these are acceptable.

iii) Bottles. Small mammals very often climb inside old milk bottles, pop bottles, etc, and are unable to get out. It is worth searching hedgerows and ditches beside roads, especially in the region of a lay-by, for such 'death-traps'. As long as the body is still identifiable, it is acceptable evidence.

iv) Occasionally small animals will simply die, and their bodies be found, out in the open. They are unlikely to lie around for long, but are obviously acceptable.

3. Droppings. Acceptable evidence for the large common species - fox, rabbit, hare, etc. Experienced observers will also recognise hedgehog, and the various deer species. However, great care should be taken with other than the very obvious ones, and it is better to use this as a 'back-up' finding.

4. Tracks. Again, acceptable for the obvious ones, and a very useful character for the more experienced. But unless you are very sure ('Mammals of Britain' is good for tracks), use this also for confirmation.

5. Owl pellets. Very Important! One of the best sources for information about small animals, and worth searching for wherever possible. If you wish, dissect out your own (in which case, please send a list of contents to Maurice Johnson at the City & County Museum, Lincoln,) or send the pellets, with a note of where they were found, to the Museum. They will be examined and a list of contents returned to you.



If you do dissect your own, possible dormouse remains must be sent to the Museum for confirmation.

6. Hazel nuts. These are opened and eaten by a variety of small animals, each in its own way. Observers with a fair amount of experience may wish to identify their own - it needs a hand lens, and some knowledge of tooth structure - and if you do, please send a labelled specimen of each species for confirmation. Otherwise, the Museum will be pleased to receive collections of nuts from each site for identification.

Notes

1. Rare Species: Marked with an asterisk below. If you sight one of these species please inform the Museum, straight away so that someone can come and look for it.

2. Bats Please record all bat sightings where the species is known. If you know of any site where bats roost or breed, please contact the Museum, or if you find a dead bat, please send it at once to the Museum.

3. Seals The main breeding areas of these animals are quite well known, and being migratory they may turn up anywhere along the coast, so that they are not easy to map. However, all sightings will be welcome.

4. Feral species Apart from Mink, these are not being mapped, but it is as well to be aware that they exist. Ferrets are particularly likely to cause confusion with weasels, stoats and especially martens. Cats are also feral in some areas, and there is even a suspicion of feral goats, so small deer should be carefully checked!

General Species Instructions

All Amphibia and Reptiles: sight records mainly, spawn and tadpoles useful (see Spring instructions) ** Report Sand Lizard, Natterjack Toad.

Mammals

Badger: Best found by tracing the set - big holes, look for typical 5-toed 'feetings' and piles of bedding on runs into the set. All year.

Coypu: Sightings, signs of battered and eaten reeds. Known from Holbeach area, may be spreading. All year.

*Deer - all species: Sightings, antlers. Slots are very obvious, especially in wet areas. Use droppings with care if there is any possibility of confusing them with sheep.

*Dormouse: Nest, size of cricket ball (typically on fringes of woodland), and where hazel present, nuts.

Fox: sightings, smell, droppings.

Hare: sightings, bodies, tracks, droppings.

Hedgehog: sightings, bodies.

Mink: sightings - like a big, dark, ferret - bodies.

Mole: hills, runs, bodies.

Mice - Harvest: nest (above ground, in reeds and grass in open places and bank sides. Smaller than dormouse nest). Nuts, owl pellets.

House: Sightings, bodies (traps) owl pellets.

Wood: Fresh stores of nuts in old bird nests and nest-boxes (this species often adapts old bird nests to mouse nests). Bottles, Owl pellets.

*Yellow-necked: only by capture - to be seen by M.J.

*Otter: sightings and webbed tracks by stream-sides (especially if they disappear into the water). This species has a very large territory, and is only confined to this while cubbing, which may be at almost any time of year. Part-eaten fish by rivers is suggestive. Whistles at night, makes 'slides'.

*Pine Marten: sighting only report on a big, overgrown stoat, with a large bushy tail, climbing trees.

*Polecat: sightings only (Doubtfully found in Lincs)

Rabbit: sightings, droppings, bodies.

Rat - *Black: bodies only

Brown: sightings, bodies, rat-holes.

Shrews, all species: bodies, bottles, owl pellets, sightings if captured.

Squirrel, both species: sightings, dreys (Grey, loose, grass and leaves; Red, more solid, made of sticks.)

Stoat: sightings, bodies.

Voiles: - Water: sightings, bottles, owl pellets.

Bank: compact nests, under logs corrugated iron sheets. Also bottles, nuts, owl pellets.

Field: runs in open grassland, nests of finely chewed grass. Also bottles, pellets.

Weasel: sightings, bodies.

Special Instructions for Autumn quarter

Look out specially for:-

Lizards and Snakes: taking advantage of late autumn sun to bask. They will be slower to move in cooler weather, and more easily identified.

Badger: collects large piles of bedding this time of year (although not hibernatory) and often drops some along its runs.

Mouse nests: very easily seen as the leaves and vegetation die back. This is the best time of year to find them.

Eaten hazel nuts: as many samples as you like (labelled with site, please) to City and County Museum, Lincoln.

Special Instructions for Winter quarter

Tracks

This is perhaps the best time of year for identifying animals by their tracks, since there is likely to be an abundance of at least one of the two best media for tracking - either snow or wet mud! Snow, if we get a good fall, is the best medium of all for tracks. Wet mud can always be found on stream sides, which should be well searched for otter tracks this quarter, as well as for water vole and water shrew prints. Look out also for mud on paths, tracks and rides, and round the edges of puddles.

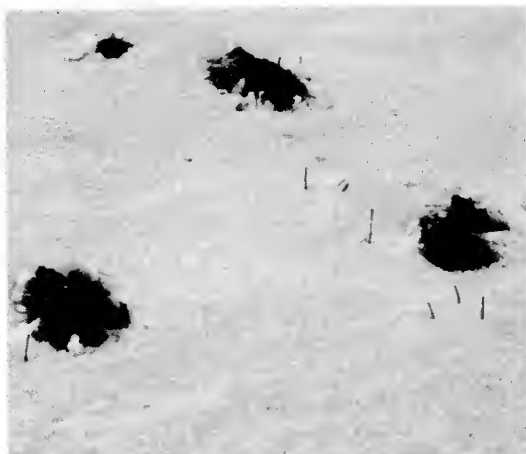
The tracks most likely to be found are those of rabbit, hare and fox - look for the typical "one-legged" look of a fox trail, as if a one-legged animal has hopped across a snow-covered field. Badgers, which don't hibernate (many people think they do) leave a very typical 5-toed track, and squirrels also will still be about. Deer tracks stand out very well in mud, and the species can be identified from them.

Tracks of the smallest animals, mice, voles and shrews are less likely to be found. However you can increase your chance of finding them by 'baiting' near a suitable puddle or stretch of mud. Fat, bird food (e.g. "Swoop"), any grain, carrots, apples or acorns are all good baits. Food should be put out in the evening, so that it isn't eaten by birds, and the area examined for tracks early the next morning. A variation of this technique is to put the food on a piece of hardboard, in such a position that the animals will cross the mud to reach it. With luck, quite clear tracks will be left on the board, which can be removed indoors to identify them. You will find a good tracking book useful. Remember that shrews all have 5 toes on all four feet, while other small animals have only 4 toes on their front feet and five on the back.

Other signs

The winter dreys of squirrels stand out very well this quarter. They can be distinguished from old birds nests by being close to the trunk, not out among the branches, and by the large numbers of dead and dried leaves they are made from. Where squirrels are around, newly stripped pine cones (with all the bracts except the top few pulled right off, leaving it looking like an apple core) will be found scattered under the trees.

Mole hills stand out very well if there is snow. At the first thaw, when the moles push up new hills, the black earth is very conspicuous against the snow.



Otters will make their slides in soft winter mud along stream sides and even in snow, so this is a good time to find them. Look out for webbed tracks in the vicinity to confirm it - just occasionally rabbits may also make slides.

In piles of beet and other root crops, look out for the incisor marks of hare, rabbit and brown rat. Stored root vegetables are a good food source for rodents, and the species can be told from the size of the teeth marks.

Small animals, particularly mice but also voles and shrews, will come into houses and outbuildings in cold weather. Any caught (preferably in live traps, so that they can be removed outside again) or killed in traps should be examined. Both harvest mice and wood mice as well as house mice will come into houses, and among the wood mice you may be lucky enough to find our rarest animal, the yellow-necked mouse. These are very like wood mice but noticeably larger, brighter coloured, and with a full broad yellow collar right across the chest. (Wood mice have a partial collar, or just a yellow spot). If you find a possible yellow-necked mouse please either photograph it, or send or take it (alive or dead) to Lincoln Museum.

Owl pellets are still the best means of confirming the presence of small animals for most people, so their importance can't be overstated. All farm outbuildings or old barns are likely places to search (with permission).

Special Instructions for Spring quarter

Mammals

At this time of the year most mammals have their young and you should not be able to miss the young rabbits that are appearing in almost every field.

In the woodlands squirrels are now using their breeding dreys; these can be distinguished from birds nests by their large size and compact dome-like construction. The majority of squirrels have their first litter of young in April. Stoats and weasels also have young and appear to move them around from time to time as parents are often seen carrying a single youngster during this season.

Badgers have their cubs early in the year, often in February, and if you have a badger set in your area it is worth looking out for signs of their first appearance above ground in April. The small footprints of the cubs in the mud at the set entrance are not difficult to see.

On mild nights you might like to try a watch for small mammals. The best way to do this is to put down bait along some hedgeside for a few days and see if it is removed. Before long the mouse or vole taking the food will become quite bold, and if you stand near and keep still and quiet you may see it come out to feed.

Down by the river watch for the water vole - an easy animal to observe whilst it is busy nibbling at the succulent water plants that form its main food. Keep a watch out for dead animals on the roads at this time of year - everything from a deer to a mouse can be found.

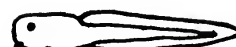
Bats are now out hunting for insect food almost every night. Please report any localities where they are seen and the approximate size of individual bats seen.

Reptiles and Amphibians

Keep an eye open for snakes, lizards, frogs, toads, etc., which are all active over the next few months. Frogs, toads and newts, all hibernate in the winter and then in early spring make their way to ponds to spawn. The first unmistakable sign of spring is the activity of frogs seeking the ponds to spawn in March. Toads are a little later in spawning and do not reach the ponds until April. You will find the tadpoles of both these amphibians in ponds during the summer.



Toad - rounded end to tail



Frog - pointed end to tail

In late April newts also can be found in the ponds so keep an eye open for them. There are three species of British newts - smooth newt, crested newt and palmate newt. The first two are common enough in Lincolnshire but we have no recent records of the third.

Special Instructions for Summer quarter

Most mammals are least easily spotted at this time of year - they are often hidden by the dense vegetation, while baked ground does not show their tracks. If the weather is dry, however, many animals will need to search for water to drink, and these drinking areas, around puddles and on the edges of rivers and ponds, can be useful places to look for tracks. Also at this time of year, nocturnal animals may come out to feed while it is still quite light, so on an evening stroll look out for foxes, and listen for hedgehogs snuffling for food in the grass.

Towards the end of this quarter there will again be nuts and acorns. Watch out for the food hordes of squirrels, and collect for examination any nut-shells found nibbled by bank-voles or wood mice.



The group to concentrate on this quarter is the Reptiles - snakes and lizards. All of them should be seen basking on grassy or sandy banks and verges, at least in the mornings, before the sun becomes too hot. Adders and lizards, including the slow-worm are traditionally found on dry heathland, while grass snakes prefer wet and marshy areas where they find the toads and frogs they eat. Grass snakes are also good swimmers, and may often be seen in ponds or rivers.

All visitors to the coast this quarter should look out for sand lizards. Sand lizards are noticeably larger than the common lizard (total length of sand lizard, including tail, about 190 mm - 7½" - against the 110 mm - 4½" - of the common lizard) and altogether bulkier and clumsier. (N.B. the sizes given above are for full-grown adults. Young of the year will be smaller than this in the autumn). They are also more brightly coloured than most common lizards and have a row of white spots down the sides. If you find one, please draw, or if possible photograph it, and report the sighting as soon as possible. Sand lizards are protected animals, and should never be collected.

While on the coast, look out for seals. Adults and young of both British species may be seen off the shore, or even basking on the beach in less crowded areas.

Bats Any and all records of bats are needed, and they should be easy to spot this quarter, especially early on, when the evenings are still quite light.

The easiest of our bats to distinguish in flight is probably the Noctule. This is our largest bat, the size of a swift, and no other should be mistaken for it. Noctules catch beetles in flight, commonly roost in trees, especially in old woodpecker holes, and should therefore be looked for anywhere in the vicinity of old woods, or parklands with large trees.

Any stretch of water visited or watched in the evening should be checked for Daubenton's bats. These have a most distinctive flight pattern, flying very low over the surface of the water, up and down, as if flying a regular "beat".

The smaller bats are very difficult to distinguish, unless an individual is captured or found dead. Long-eared bats catch moths on the wing, then hang themselves up in a handy porch or garage to eat them, first biting off the wings. Even if the bat itself is not seen, a pile of moth wings in a suitable place is very suggestive of the presence of Long-eared bats, since they are the only species with this habit in this county.

Several species roost in house lofts and church roofs or belfries. Please report any roosts you know of or suspect, so that they can be examined. Our commonest bat the pipistrelle is the one most often found in this way, but such roosts may also have whiskered bats, which may well be commoner in the county than our present records show.

ACKNOWLEDGEMENTS

First my thanks must go to Mrs A L Goodall who took on the task of correcting the typescript and preparing the distribution maps, for without her help and encouragement the book would not have been possible.

I am also very grateful to the many observers, members of the LNU and others, who gave up so much of their time to search for animals and fill in the survey forms. I would especially like to mention and thank the following recorders who sent in a vast amount of records: Mr F Brasier in the north-west, Mr E J Redshaw in the fens, Mrs A L Goodall in the Scunthorpe area, Mr J East for Bardney, Miss N Goom for Sleaford, Miss E J Gibbons for Glentworth, Mr P J Wilson for Lincoln, Mrs I Weston for Riseholme, Mrs V Wilkin for Brigg, and the late Mr E Clipson for the area around Woodhall. I also wish to thank members of the Forestry Commission staff for their friendliness and help, and to acknowledge the help given by teachers and schoolchildren all over the county.

My grateful thanks go to Messrs M J Barke, J A East, R N Goodall and P J Wilson for their skill in printing many of the photographs. The following photographs were kindly supplied: Polecat ferret, by Mr A White; Common frog, Common toad, Long-eared bat in flight, by Mr P J Wilson. All other photographs are by the author.

Other acknowledgements of sources of information will be found in their respective places in the text.

M Johnson,
Lincoln



LINCOLNSHIRE NATURALISTS' UNION

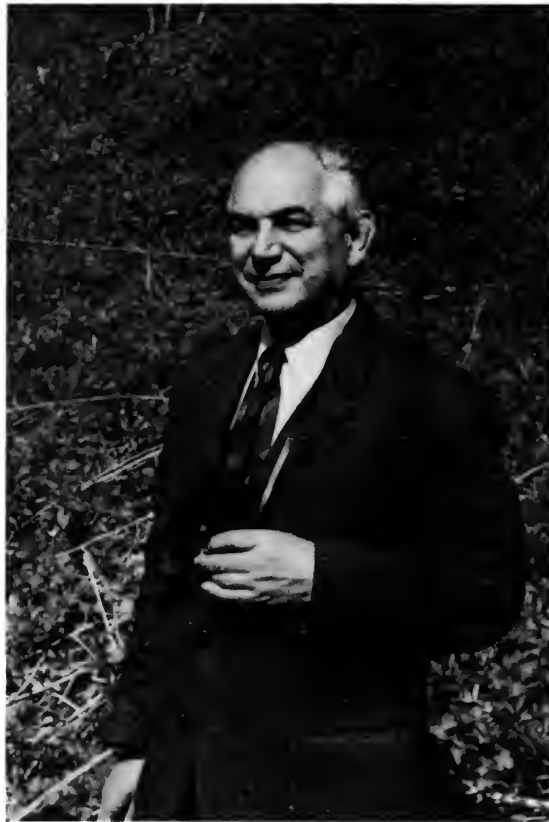
The Union was founded in 1893 to promote the thorough investigation of the flora, fauna and physical features of the county; to bring together people following the same pursuits; to increase the interest in and study of every branch of natural history; and to publish the results of the work done.

To further these ends the Union holds field meetings throughout the year and provides lectures and general indoor meetings during the winter months. Members may also take part in a range of survey work organised on behalf of national bodies. The Union has a number of experts in different fields of natural history to assist members in the identification of specimens, though every effort is made to identify material in the field to avoid the need for collecting. The Union has a library and reference collections of local material, which are available to members by appointment at the City and County Museum, Lincoln.

The Transactions of the Union contain a record of work done and meetings held during the year, together with papers on Lincolnshire natural history topics. They are published annually and are free to members. A list of other publications is given on the opposite page.

Further information may be obtained from:

Hon General Secretary,
Lincolnshire Naturalists' Union,
C/o The City and County Museum,
LINCOLN.



MAURICE JOHNSON FZS

Mr Johnson, President of the Lincolnshire Naturalists' Union 1982, is Assistant Keeper at the City and County Museum, Lincoln. One of his responsibilities includes maintenance of the Biological Records Centre for Lincolnshire and South Humberside which is situated at the Museum.

Although an accomplished all-round naturalist of long standing, Mr Johnson has a particular interest in vertebrate zoology. He is a member of the Mammal Society and an elected Fellow of the Zoological Society.

Before he came to Lincoln in 1965, Maurice Johnson studied wildlife in the North York Moors National Park and during that time specialised in observations on bats and badgers. Following this work he took part in several radio programmes for the B.B.C. When he forsook his native Yorkshire for Lincoln he joined the LNU and became secretary of the LNU Vertebrate Zoology Section in 1967, a post which he held until 1981 when he became president of that section. He also served as secretary to the Ornithology Section from 1968 until 1972.

In recent years the fruits of his studies have produced material for both television and radio programmes and numerous articles for newspapers and journals.

The Atlas represents the results of a survey by members of the LNU and others between 1975 and 1978 in an attempt to bring up to date our knowledge of this neglected aspect of our wildlife.

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Cover photograph:
Harvest mouse (*Micromys minutus*)
by Maurice Johnson, FZS